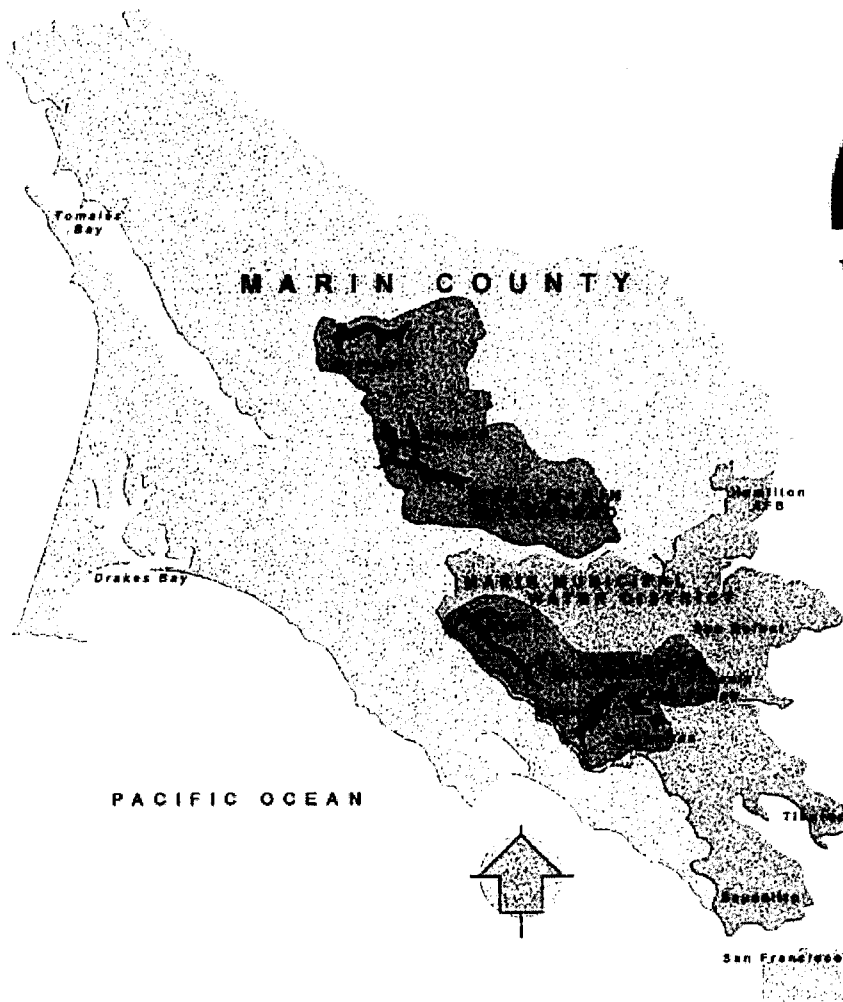


Marin Municipal Water District

URBAN WATER MANAGEMENT PLAN 2005



ADOPTED JANUARY 18, 2006

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Marin Municipal Water District 2005 Urban Water Management Plan Contact Information

Date plan submitted to the Department of Water Resources: **January 20, 2006**

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The Water supplier is a: **Municipal Water District**

The Water supplier is a: **Retailer**

Utility services provided by the water supplier include: **Potable and Recycled Water**

Is This Agency a Bureau of Reclamation Contractor? **No**

Is This Agency a State Water Project Contractor? **No**

Public Participation

Law -- Water Code, Division 6, Part 2.6, Chapter 3, Article 3

10642. Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published ... After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

Public Participation

The Marin Municipal Water District has actively encouraged community participation in its water planning efforts over the years. With the advent of urban water management plans, public meetings were then held on the 1985, 1990, 1995, 2000 plans. As noted in the District's 2000 Urban Water Management Plan (UWMP), in 1991 the District entered into an integrated water management plan process that encourages and incorporates public input as a part of the District's development of both water supply and demand management efforts. Over the past five years, the District has been reviewing and updating elements of its integrated water management plan with input from the public.

Prior to this update to the Urban Water Management Plan, a series of public meetings was held related to the District's supply/demand balance. This led to the District's further review of its demand management, water recycling, groundwater and bay water desalination opportunities. There were a number of public meetings on these topics over the last five years. A list of publicized public meetings/workshops follows:

Meeting	Date	Location
Public Forum: Sonoma County Water Agency Contractors Issues	April 4, 2001	MMWD Board Room
Public Forum: Recycling Study & Conservation Study Final Reports	May 16, 2001	MMWD Board Room
Public Forum: Desalination Study Final Report & Russian River Environmental Issues	June 19, 2001	MMWD Board Room
Public Forum: Supply Issues – legal issues re growth, rationing plan	July, 2001	MMWD Board Room
Desalination "Gaming" Workshop	August 27, 2002	MMWD Board Room
Public Hearing on the 2000 Urban Water Management Plan	March 19, 2003	MMWD Board Room
Public Forum: Desalination Public Opinion Survey	April 16, 2003	MMWD Board Room
Public Forum: Consider Water Conservation Program activities for Fiscal Years 2004 and 2005	May 21, 2003	MMWD Board Room
Desalination Workshop	June 25, 2003	Marin Art and Garden Center
Public Forum: Conservation Rate Structure Advisory Committee Rate Structure Proposal	September 17, 2003	MMWD Board Room
Public Forum: Discussion on the Sonoma County Water Agency's proposal for a new water supply agreement	September 17, 2003	MMWD Board Room

MARIN MUNICIPAL WATER DISTRICT 2005 URBAN WATER MANAGEMENT PLAN

Public Forum: Desalination/Russian River and other water source options	January 5, 2004	MMWD Board Room
Public Forum: Desalination/Russian River and other water source options	January 7, 2004	MMWD Board Room
Public Forum: Study Seeking a Groundwater Supply on the Watershed	February 4, 2004	MMWD Board Room
Public Forum: Review of end of year Water Conservation Activities in 2003	March 3, 2004	MMWD Board Room
Public Forum: Desalination/Russian River and other water source options	March 3, 2004	MMWD Board Room
Public Forum: Description of Water Supply Source Options	April 21, 2004	MMWD Board Room
Public Forum: Desalination Pilot Program Development	May 19, 2004	MMWD Board Room
Public Forum: Description of Water Supply Source Options	May 19, 2004	MMWD Board Room
Public Forum: Groundwater Supply Study	June 2, 2004	MMWD Board Room
Public Forum: Description of Water Supply Source Options	June 2, 2004	MMWD Board Room
Public Forum: Desalination/Russian River and other water source options	June 16, 2004	MMWD Board Room
Public Forum: Desalination/Russian River and other water source options	July 7, 2004	MMWD Board Room
Public Forum: Desalination Pilot Program	July 21, 2004	MMWD Board Room
Public Forum: Desalination/Russian River and other water source options	February 2, 2005	MMWD Board Room
Public Forum: Desalination Pilot Plant Public Outreach Expansion	February 16, 2005	MMWD Board Room
Public Forum: Water Supply Options	March 2, 2005	MMWD Board Room
Public Forum: Water Supply Options	April 6, 2005	MMWD Board Room
Desalination Pilot Plant Open House Tours	August 6 & 20, 2005 September 10 & 24, 2005 October 15 & 22, 2005	MMWD Desal Pilot Plant
Public Forum: Water Supply Options	September 21, 2005	MMWD Board Room
Public Hearing on the 2005 Urban Water Management Plan	January 18, 2006	MMWD Board Room

Plan Adoption

The Marin Municipal Water District staff prepared this update of its Urban Water Management Plan during Fall 2005. The updated plan will be submitted for adoption by the Board of Directors at their January 18, 2006 meeting and then will be submitted to the California Department of Water Resources within 30 days of Board approval.

Supplier Service Area

Law

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

10631. (a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.

Description of District and Service Area

Introduction

The Marin Municipal Water District (MMWD) serves the populous eastern corridor of Marin County from the Golden Gate Bridge northward up to, but not including, Novato, is bounded by the San Francisco Bay on the east, and stretches through the San Geronimo Valley in the west. The District covers approximately 147 square miles and serves a population of approximately 190,000 through about 61,000 active services. The District's service area is shown on the cover of this report.

Climate

MMWD has a Mediterranean coastal climate. Summers are mild and dry, and winters are cool and wet, with an annual average of 30 inches of precipitation in the service area and over 50 inches of rainfall on our Mt. Tamalpais watershed. The region is subject to wide variations in annual precipitation and contains a multitude of microclimates. Summer fog helps reduce summer irrigation requirements.

Historic Demographic and Water Demand Factors

Prior to the organization of the Marin Municipal Water District, water service was provided by several unrelated private water companies. The principal water companies operating in the County were the Marin Water and Power Company and the North Coast Water Company. In 1911, a group of public-spirited citizens organized the Southern Marin Water District Association to place the water supply of the County on a public-ownership basis. As a result of the efforts and work of this organization, a petition bearing 1,863 validated signatures was presented to the County Board of Supervisors in January 1912, paving the way for an election for the incorporation of the Marin Municipal Water District. The District received its Charter from the Secretary of State on April 25, 1912. The Municipal Water District Act was created for MMWD, the pioneer municipal district in the state.

Marin County was typically characterized as a summer vacation area in the early 1900s. With the completion of the Golden Gate Bridge in 1936, the County began to develop into a bedroom community supporting the business and industry of San Francisco and the East Bay.

POPULATION AND CONSUMPTION TRENDS WITHIN THE MARIN MUNICIPAL WATER DISTRICT SERVICE AREA		
Year	Population	Water Production (potable & recycled)
1940	48,000	3,989 acre-feet
1950	78,000	9,207 acre-feet
1960	124,000	19,334 acre-feet
1970	168,000	32,530 acre-feet
1980	167,000	27,313 acre-feet
1987*	168,000	32,837 acre-feet
1990	170,000	29,122 acre-feet
1995*	176,000	28,350 acre-feet
2000	185,000	31,165 acre-feet
2004	190,000	32,478 acre-feet

*Years shown are pre- and post-drought of the late 1980s and early 1990s

Growth in Marin, mainly residential in nature, boomed during the period following World War II up to the early years of the 1970s. Growth during the last two decades has averaged less than 1% per year, and the County Planning Department indicates that only 4% of lands within the County remain available for new development. As shown in the table above, the population within the District was level during the 1970's and 1980's. During that same period, the number of services increased by 21%, from 46,000 to 58,000 with the majority being residential services. During the same period of time, the number of people per household declined from 3.1 to 2.5. The 1990s and early 2000s has seen a trend of increasing population of about 1% per year or less.

The following table shows the population for the MMWD service area for 2005, with projections based on the Association of Bay Area Governments' (ABAG) projections to 2030 for the District's service area.

Population Projections – Based on ABAG's Projections 2005						
	2005	2010	2015	2020	2025	2030
MMWD Service Area Population	190,800	195,362	202,155	205,763	208,971	212,256

The projections indicate a slowing of the growth seen during the last decade. The ABAG figures project a growth rate of about 0.45% per year for the 25 year period.

Past Drought and Emergency Conservation Information

The local region experienced a brief but deep drought in the period from 1975 through 1977. This drought was severe and became the MMWD's drought of record. A more prolonged drought punctuated with brief periods of rainfall occurred from 1987 through 1992.

During the drought of the 1970s MMWD explored the feasibility of groundwater use and found those sources were very limited and were also impacted by the drought. The District stepped up its efforts to distribute low-flow showerheads, toilet tank displacement bottles and water conservation literature and constructed pipelines across the Richmond-San Rafael Bridge and to Sonoma County to import water. Ultimately, the District relied heavily on the ability of its consumers to make radical reductions in the amount of water they consumed. During the final stage of the drought consumers reduced their water use by some 63% when the District went into a mandatory water use reduction program.

Following the drought of the 1970s the District continued to add water conservation programs, added more surface water storage and developed its recycled water program. By 1987 the water demand had returned to pre-drought levels. However, with improved supplies and the ability to import water from the Sonoma County Water Agency (SCWA), the District was able to make lessened requests for mandatory water use reductions during the drought of the late 1980s and early 1990s. The increase in services and population between 1975 and 2005 indicates that the District's consumers have achieved about a 25% use reduction compared to the non-conserving water use level of 1975.

Water Sources (Supply)

Law

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

10631 (b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments [to 20 years or as far as data is available.]

Current Water Supply Sources

Local Surface Water Supplies

Until 1976, all of the District's water supply was obtained solely from rainfall collected from a watershed of approximately 28 square miles of District-owned lands, and 36 square miles not owned by MMWD. Six reservoirs on the watershed then had a storage capacity of 17.3 billion gallons. Through a bond issue authorized during the drought of the 1970s a seventh reservoir was completed in 1980, SoulaJule Reservoir, which added 3.4 billion gallons to total storage. The \$19 million SoulaJule project was authorized by the electorate in 1976.

The District's Kent Lake facility was then expanded by raising the existing dam 45 feet. This increased the storage capacity from 5.4 billion gallons to 10.6 billion gallons. The \$9.5 million project was completed in June, 1982.

Total reservoir storage operated by MMWD is now 25.9 billion gallons (79,566 acre-feet).

Water Supply Facts

Watershed Lands (acres)	21,250
Number of Storage Reservoirs	7
Total Reservoir Storage Capacity	
a. Acre Feet	79,566
b. Millions of Gallons	25,927
Average Yearly Rainfall (inches at Lagunitas Lake)	52.5
Median Yearly Runoff	
a. Acre Feet	61,415
b. Millions of Gallons	20,012
Operation Yield Goal (AF) ¹	29,300

Potable Water Facilities

Miles of Pipeline	925
Number of Storage	140
Total Tank Storage Capacity (million gallons)	83
Number of Pump Stations	95

¹ The amount of water that can be supplied in all but very dry years with programmed reductions in water use in dry years such that reservoir water storage at the end of the drought of record would not be below minimum operational levels.

Number of Water Treatment Plants	3
Nominal Daily Treatment Plant Production (million gallons per day)	29
Maximum Daily Treatment Plant Capacity (million gallons per day)	59

Imported Water Supplies

Since 1975 the District has contracted with the Sonoma County Water Agency (SCWA) for a supplemental supply of water, primarily from the Russian River. The District's present contract with SCWA is based on two antecedent documents: the Off-peak Water Supply Agreement and its amendments, dating from 1975 and the Agreement for the sale of water between SCWA and MMWD, of 1991. In 1996, these two contracts were combined into a single new agreement, the Supplemental Water Supply Agreement.

In its original form, the Off-peak Agreement allowed MMWD to take delivery, in the months of October through April, of up to 4,300 acre-feet of water surplus to the needs of all other SCWA customers. The contract was amended twice before its inclusion in the Supplemental Water Supply Agreement of 1996. The first amendment changed the basis of delivery of this water from "surplus" to "firm", meaning that MMWD water deliveries would be as reliable as was provided to SCWA regular contractors. The second amendment allowed deliveries during the summer months.

The 1991 Agreement for Water Supply allowed MMWD to take delivery of up to 10,000 acre-feet of water per year beyond the amount included in the Off-peak Agreement. These water deliveries were classified as "as available". This meant that the contracted water supply was secondary to water provided to other SCWA contractors, and to water provided under the Off-peak Agreement, but would be provided unless certain predefined conditions existed.

The Supplemental Water Supply Agreement combined the two prior agreements such that MMWD can now take deliveries of up to 14,300 acre-feet per year from SCWA. All such deliveries are now classified as "firm" water. The contract places seasonal limitations on water delivery rates to the District. In winter, maximum delivery rate is 23 mgd and in summer total deliveries are limited to 12.8 mgd.

The contract will remain in force until June 30, 2034, the expiration date of the current Russian River water supply master agreement between SCWA and its 8 prime contractors other than MMWD. However, it can be extended at the request of MMWD for a term not to exceed the term of any renewal of the SCWA master water supply agreement.

In addition to these numerical delivery limits, Russian River deliveries to the District are subject to available pipeline capacity in facilities owned by SCWA and the North Marin Water District. Russian River water is diverted by SCWA at a series of sub-surface collectors near Wohler Bridge. SCWA also has backup/supplemental well capacity at Mirabel and Laguna de Santa Rosa that it uses to address operational and maintenance activities of the agency. Water destined for the District flows through SCWA pipelines to Petaluma. From Petaluma the water flows southward in the North Marin Water District's aqueduct eight miles to the northern end of the District's pipeline facilities in Novato. As the North Marin Water District and SCWA water use increases in the future there will be less pipeline capacity in their facilities available for water deliveries to MMWD. When these limitations have a significant impact, MMWD has the option to construct new pipelines to supplement the capacity available in the other agencies' facilities and assure continued delivery of Russian River water to MMWD. The need for and the timing of such improvements have been under review by the District for the past several years.

Groundwater

Marin County is located in the midst of California's Coast Range, where the western edge of the North American Plate meets the Pacific Plate. Much of the geology of the area has been influenced by the seismic activity of the San Andreas fault.

The ancient seafloor in the area was lifted up by both volcanic and seismic activity to form the low mountain region. The underlying bedrock unit is a jumbled mass referred to by geologists as the "Franciscan Formation, Group or Complex." Evidence of the chaotic nature of this history can be seen in many sites throughout Marin County.

Groundwater in the area is very limited as it is either found in fractures in the Franciscan Formation or in shallow alluvial deposits in valleys. In the mid-1970s the District explored possible well locations in the Headlands area just north of the Golden Gate and on Mt. Tamalpais and found that after several days of pumping at relatively low rates the wells began to show significant drawdown. A report prepared in 1978 on the groundwater potential of the Ross Valley, the area's largest contained alluvial deposit, found that the capacity of that source was very limited and already was being utilized for landscape irrigation purposes by both public and private parties.

In recognition of the lack of groundwater supply in the area, the District Board in 1978 adopted Policy No. 3 "Wells and Other Private Water Sources." The policy encourages the use of wells for non-potable uses such as landscaping while noting that the supplies are subject to shortage during hydrologically dry periods and should only be a supplement to water service provided by the District.

The District continues to evaluate the possible development of groundwater supply in its service area. In 2004, the District commissioned a study to evaluate the development of groundwater in upper Lagunitas Creek. The concept was to evaluate whether leakage from the District's reservoirs might overcome the infiltration resistance of the tight Franciscan Formation and thus, become a viable supply. The study indicated only a slight chance that sufficient quantities in fractured rock could be developed. A second phase was proposed for the drilling of 5 exploratory test wells. This proposal is currently being evaluated by the District.

Desalination

MMWD is currently engaged in the operation of a Seawater Desalination Pilot Plant Program at the Marin Rod & Gun Club, San Rafael, California. Although MMWD conducted a desalination pilot study at this same location in 1990, additional study is necessary at this time for the following reasons:

- Desalination and pretreatment processes have evolved and improved significantly since 1990. Pretreatment technologies using microfiltration (which were not commercially viable in 1990) offer the potential to improve pretreatment reliability and quality and to extend the service-life of reverse osmosis membranes and improve their efficiency. These improvements can result in a reduction of both operating cost and energy requirements.
- As with all water treatment processes, there are always unique site-specific variables and it is prudent to prove their effectiveness before committing to design on a larger scale. Taking shortcuts in this arena resulted in problems at the desalination facility in Tampa.
- Although MMWD's earlier pilot testing demonstrated that desalinated water tasted great and was free of contamination, concerns persist about the purity of desalinated water coming from San Francisco Bay. Compared to 1990, there are more contaminants of concern and our ability to test and detect contaminants in smaller concentrations has also improved.
- Although many MMWD customers and other Bay Area citizens toured the pilot plant in 1990, many current customers have not had an opportunity to learn first hand about desalination.
- Fresh pilot test data and bioassay of the brine discharge will enhance and benefit the Environmental Impact Report for the full-scale desalination plant that is currently under development.

The pilot plant is a \$1.5 Million, 9 – 12 month program to evaluate the viability of desalination and its environmental implications. The final task of the Seawater Desalination Pilot Plant Program is to prepare a Preliminary Design Report (PDR). Based on the data and findings from the pilot plant program, a concept-level plan will be developed for the full-scale (10-15 mgd) desalination facility. This report will

provide the design basis for moving ahead with the full-scale project. Workshops will be facilitated with MMWD staff on major equipment, plant operations and control, facility security, and general site layout. Additional site investigations, including an updated aerial topographic map of the proposed plant site and a preliminary geotechnical investigation to characterize the site and provide preliminary seismic and foundation criteria will be conducted as part of the PDR. Major design and process concepts will be evaluated using the pilot study results, and fundamental design criteria on the intake, pre-treatment, reverse osmosis (RO) membrane system, and solids handling facilities will be developed. Capital and annual operating costs will also be further refined and documented in the PDR. Subtasks to be included in this effort include the following:

- Development of a preliminary site plan and facilities layout
- Design considerations on the feed water intake system
- Geotechnical investigation and structural design criteria
- Technological considerations and process design criteria for the SWRO plant
- Design considerations on the brine discharge and management
- Product water criteria and characteristics
- Project economics: capital expenditures, O&M cost, Total Water Cost – TWC
- Coordination with the Environmental Consultant on regulatory and permitting issues and impacts on the full-scale facility
- Coordination of brine blending concepts with CMSA effluent

Public outreach is a major component of the desalination pilot program. The goal is to educate the public and media on the technology employed by the pilot plant program and of the water quality a desalination plant will produce.

Wastewater Disposal and Recycled Water Uses

Law

10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. To the extent practicable, the preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies and shall include all of the following:

10633 (a) A description of the [...] methods of wastewater disposal.

10633 (b) A description of the recycled water currently being used in the supplier's service area, including but not limited to, the type, place and quantity of use.

10633 (c) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.

10633 (d) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years.

Description of Waste Water Agencies and Quantities

Within the MMWD service area there are thirteen waste water agencies. Of these, seven are collection agencies only and six have treatment facilities. Three utilize some form of recycled water for landscape irrigation and other purposes. Information on the individual agencies is included below.

Recycled water opportunities are limited by the sodium and chloride levels of the source water. However, data on sodium and chloride levels is not readily available from the sanitary agencies. In order to get an idea on approximate dry-weather sodium and chloride levels, MMWD requested 24-hour composite samples from Sanitary District #5, Sausalito-Marin City Sanitary District, and SASM. The samples were analyzed for their sodium and chloride content. The results show that Sanitary District #5 and Sausalito-Marin City Sanitary District have sodium in the 600-700 mg/L and chloride in the 1000-1300 mg/L range. These numbers approximate dry-weather pattern even though they were obtained in December because there was a long dry-spell before the samples were taken. SASM came in with sodium in the range of 200-300 mg/L and chloride 300-400 mg/L. The small recycled water system which they use to irrigate an adjacent park can only be operated at low tide cycles or diluted with potable water.

Almonte Sanitary District

Location:	Mill Valley, CA
Facilities:	6 Miles of Sewer Pipe
Average Dry Weather Flow:	0.139 MGD
Method of Disposal:	Sewerage Agency of Southern Marin

Alto Sanitary District

Location:	Mill Valley, CA
Facilities:	2.6 Miles of Sewer Pipe
Average Dry Weather Flow:	0.084 MGD

Central Marin Sanitation Agency	Method of Disposal: Location: Facilities: Average Dry Weather Flow: Method of Disposal:	Sewerage Agency of Southern Marin San Rafael, CA Treatment facility 8 MGD Outfall to San Francisco Bay, Limited Onsite Reclaimed Uses
Homestead Valley Sanitary District	Location: Facilities: Average Dry Weather Flow: Method of Disposal:	Mill Valley, CA 9.6 Miles of Sewer Pipe 0.18 MGD Sewerage Agency of Southern Marin
Las Gallinas Valley Sanitary District	Location: Facilities: Average Dry Weather Flow: Method of Disposal:	Marinwood, Santa Venetia, Rafael Meadows, Terra Linda, Lucas Valley Class 3 Treatment Plant, 100 Miles of Sewer Pipe 2.2 MGD Shallow water discharge to Miller Creek, tributary to San Pablo Bay, Onsite Pasture Land Irrigation, MMWD Water Recycling Plant
Richardson Bay Sanitary District	Location: Facilities: Average Dry Weather Flow: Method of Disposal:	Sausalito, CA 3 Miles of Force Main; 20 Pump stations; Secondary Reclamation - 70,000 gallons/day Used for Irrigation, Dust Control, Hydro Cleaner Not Available Outfall to San Francisco Bay, Reclamation
Sanitary District No. 1	Location: Facilities: Average Dry Weather Flow: Method of Disposal:	Fairfax, San Anselmo, Ross, Larkspur, south San Rafael, north Corte Madera, Sleepy Hollow, Kentfield, Kent Woodlands, Oak Manor, Greenbrae 180 Miles of Sewer Lines, 20 Pumping Stations 3 MGD Central Marin Sanitation Agency
Sanitary District No. 2	Location: Facilities: Average Dry Weather Flow: Method of Disposal:	Corte Madera, Larkspur, Unincorporated Areas of Marin 39.4 Miles of Sewer Main, 16 pump Stations 0.81 MGD Central Marin Sanitation Agency
Sanitary District No. 5	Location: Facilities: Average Dry Weather Flow: Method of Disposal:	Corte Madera, CA 0.98 MGD treatment plant, 21 Pump Stations 0.765 MGD Central Marin Sanitation Agency
San Rafael Sanitation District	Location: Facilities: Average Dry Weather Flow: Method of Disposal:	San Rafael, CA 158 Miles Gravity Sewer, 29 Miles Force Main, 29 pumping Stations 4.4 MGD Central Marin Sanitation Agency
Sausalito-Marin City Sanitary District	Location: Facilities: Average Dry Weather Flow:	8 Miles Force Main, 7 Miles Gravity 1.4 MGD

Method of Disposal:

Outfall to San Francisco Bay

Sewerage Agency of Southern Marin

Location:

Tiburon/Mill Valley, CA

Facilities:

Treatment Plant, 0.12 MGD Reclamation Facility

Average Dry Weather Flow:

2.9 MGD

Method of Disposal:

Outfall to San Francisco Bay, Recycle About 4 MG/YR for irrigation of adjacent park

Tamalpais Community Services District

Location:

Mill Valley, CA

Facilities:

40 Miles of Gravity Sewer, 2 Pump Stations, Plans for 2 Additional Pump Stations

Average Dry Weather Flow:

0.359 MGD

Method of Disposal:

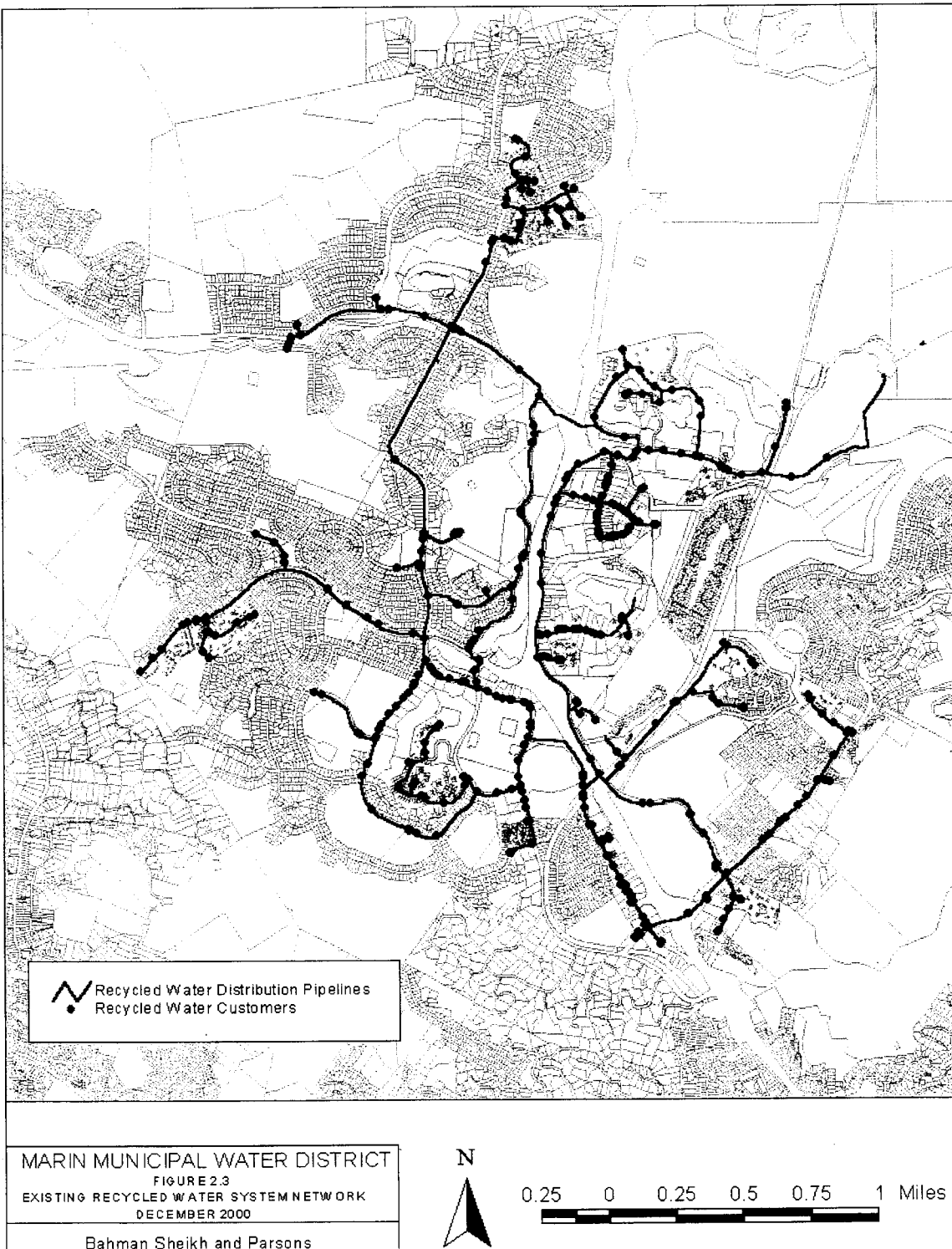
90% to Sausalito-Marín City Sanitary District
10% to Sewerage Agency of Southern Marin**Recycled Water Supplies**

MMWD started water recycling during the drought of 1976-77 when a pilot plant was pressed into service for drought relief. This experience vividly demonstrated that recycled water was available when other sources dried up. Increased concern about limited potable supplies led to a joint effort with the Las Gallinas Valley Sanitary District to build a permanent facility. In 1981, a 1-MGD direct filtration plant was completed and served 60 acre-feet annually to nearby McInnis Park and highway landscaping. Plans for further expansion were set back when the state water reclamation regulations (Title 22) were made more stringent. The water quality that the plant was capable of producing was no longer deemed adequate for irrigating parks, playgrounds, and greenbelts.

In 1989, the District upgraded the facility from direct filtration to full conventional treatment and increased capacity to 2-MGD. With improved water quality, the District was able to expand its market. From 1990 through 1994, the distribution system was enlarged using District funds plus a \$5 million low-interest loan from the State Revolving Fund. Today the MMWD recycled water system contains 25 miles of pipeline, 1.7 MG of storage, 4 pump stations and serves an average 650 acre-feet per year through 323 service connections.

The various types and numbers of recycled water customers are tabulated below:

Commercial Landscape Irrigation (retail, office, etc)	113
Multi-Family Residential (apartments, condos, townhomes, HOAs)	107
Single Family Residential	28
Municipal Parks & Playgrounds	16
Schools (K-12)	11
Irrigation (median strips, highway landscape)	26
Toilet / Urinal Flushing	16
Car Washes	3
HVAC Cooling Towers	2
Commercial Laundry	1



MMWD's recycled water program has been in continuous operation since 1981. The construction cost of the recycled water system was \$16 million, but would cost over \$25 million to build today. Currently the cost in this area to install water distribution piping is \$150-200/foot. The existing 25 miles of distribution were installed at \$50-100/foot. Because there are virtually no large-scale irrigation accounts and no major industrial water users in this area, MMWD has turned to innovation to keep the recycled water system growing.

Pioneering New Uses for Recycled Water

Although irrigation remains the primary use (95%) for recycled water, due to a limited market for expansion, MMWD has pioneered non-traditional uses of recycled water to optimize the efficiency of its recycled water system.

Flushing toilets with recycled water – As a result of efforts launched in 1991, there are now 16 buildings in the MMWD service area that use recycled water to flush toilets and urinals, more than any other water district in the USA. This includes the 330-bed Marin County Jail, the first use of recycled water in a penal institution. All new buildings in the recycled water service area are required to be constructed with dual plumbing to use recycled water indoors as well as for landscape irrigation.

Car washes with recycled water - In 1995, MMWD was the first in California to use recycled water in a car wash. Building on that success, two new car washes were constructed to use recycled water. All new car washes in the recycled water service area are required to use recycled water.

HVAC Cooling Towers with recycled water– Although it required four years of negotiation to overcome regulatory concerns about *Legionella*, in 1995 MMWD successfully pioneered the first use of recycled water in a HVAC cooling tower. Since then a second building has had the HVAC converted to recycled water.

Commercial Laundries with recycled water – Although it required two years of negotiation to gain regulatory approvals, in 1998 MMWD was the first water district in California to convert a commercial laundry to use recycled water.

Legislative Accomplishments and Awards

In order to improve opportunities for water recycling in Marin and throughout California, MMWD has been an active advocate of legislative and regulatory issues involving recycled water. MMWD has taken the lead in the following areas:

- AB 24 in 1990 - which created low-interest loans for recycled water projects.
- AB 1698 in 1991 – which empowered public agencies to require dual plumbing in buildings.
- California Ad Hoc Dual Plumbing Committee – which established the first plumbing code language for constructing dual plumbed buildings.
- CA/NV AWWA Recycled Water Retrofit Guidelines – A 3-year effort, MMWD was primary author for these guidelines which created a user-friendly document to facilitate recycled water retrofits. This effort was endorsed by state health departments in both California and Nevada.
- Operator Certification – MMWD lead effort in 1997 to allow either state-certified water or wastewater operators to operate recycled water plants.
- AB 1522 in 1997 – which expanded the types of buildings that could be dual-plumbed to use recycled water indoors as well as out.
- 2002 Recycled Water Task Force – Statewide effort to examine the obstacles and impediments to recycled water in California.

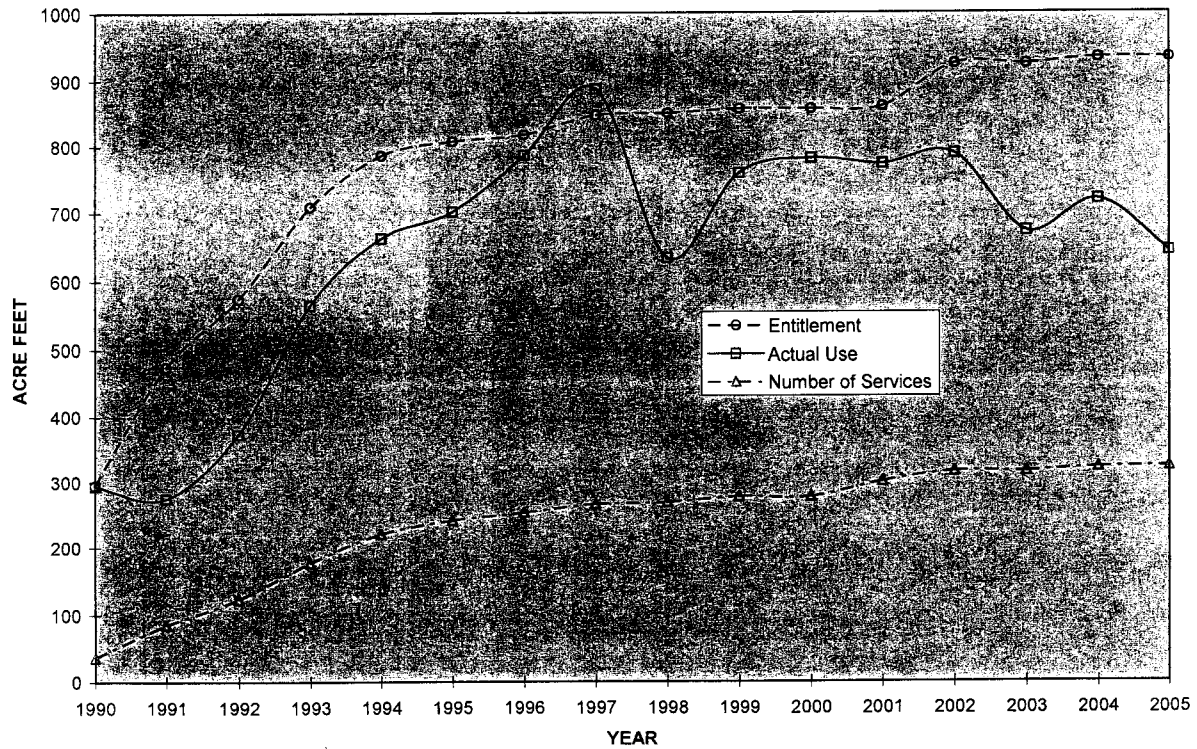
Water Recycling Awards – MMWD, employees, and customers have received awards for their significant contributions to water recycling as follows:

- 1993 - MMWD Water Recycling Plant received award for Engineering Excellence from the Consulting Engineers and Land Surveyors of California
- 1994 MMWD's Water Recycling Program won a Special Award of Merit from the WaterReuse Association of California in recognition of the innovative and pioneering aspects of the program.
- In 1997, the Association of California Water Agencies named MMWD as a finalist in the Innovations Category of ACWA's Clair A. Hill Water Agency Award for Excellence. This award recognized MMWD's Recycled Water Demonstration Garden, recycled water training manual, and seminars for landscape professionals.
- 1998 - In recognition of MMWD staff member, Ken Feil's leadership in creating the Recycled Water Retrofit Guidelines, in 1998 Ken received the George A. Elliot Memorial Award from the CA-NV Section of the American Water Works Association.
- 2000 – Bob Castle received Outstanding Service Award for 2000 from the WaterReuse Association.
- 2002 – MMWD Recycling Program received award for Outstanding Contribution to Sustainable Water Use from the WaterReuse Association
- 2002 – MMWD customer, Nazareth House, received award for Outstanding Recycled Water Customer for having the world's first commercial laundry to use recycled water.

Ongoing MMWD Water Recycling Activities

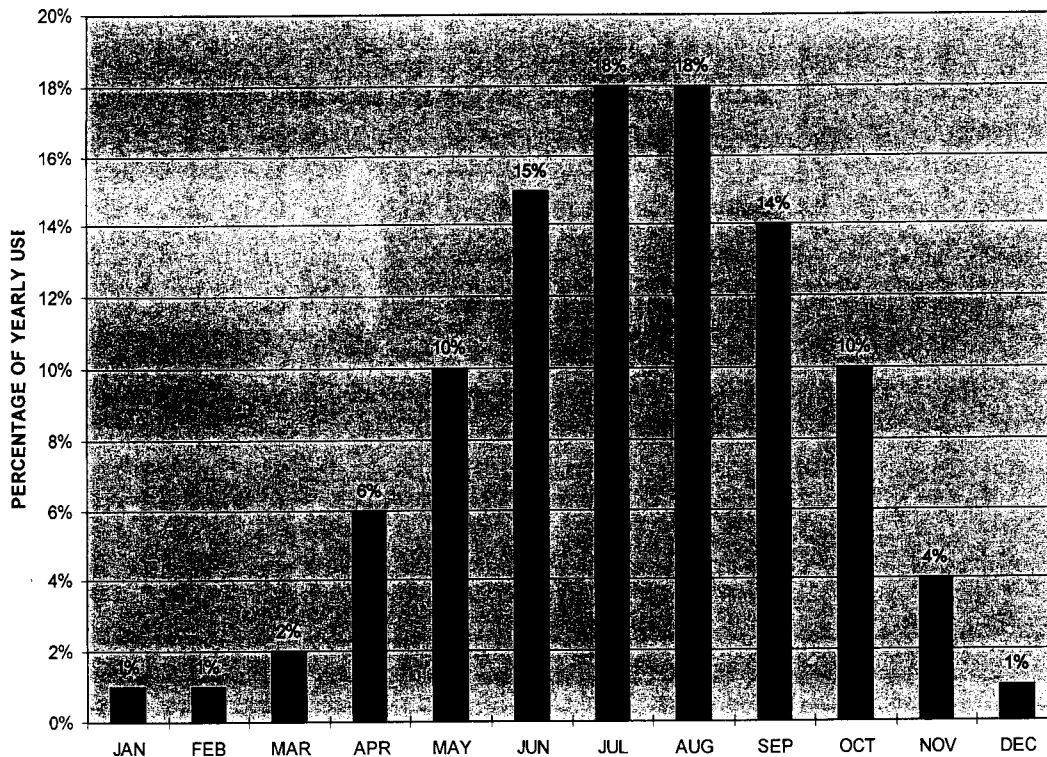
Over the past fifteen years, MMWD has consistently expanded the use of recycled water, number of sites served, and the total amount of recycled water put to use. The figure on the next page shows the trend in the number of sites and volume of water from 1990 to 2005. The recycled water distribution system currently serves 323 customers. The system is located in the northern part of the MMWD service area from the Marin County Civic Center through Marinwood. All customers on the system are served recycled water from the MMWD's Las Gallinas Recycling Plant operated in conjunction with the Las Gallinas Valley Sanitary District. At this time, almost all of the customers along the 25 miles of existing pipeline have already been converted from potable to recycled water.

LGVRP RECYCLED WATER GROWTH



As shown on the chart below, unlike many areas of Southern California, Marin County experiences a relatively wet rainy season which limits the season for landscape irrigation to about 7 months of the year (April through October).

AVERAGE RECYCLED WATER USE BY MONTH



Recycled Water Incentives

The District uses a variety of incentives to encourage recycled water use. One of the more positive marketing aspects of recycled water is reliability. The droughts of 1976-77 and 1987-92 necessitated severe rationing with resultant damage to customers' landscape plantings. Recycled water is not subject to cutbacks due to drought and thereby protects a customer's investment in landscaping.

Several District policies also encourage use of recycled water. The rate for recycled water was originally established at half of the tier 1 potable rate. It currently stands at 56% of the tier 1 potable rate and use above 100% of the service's Water Budget is subject to higher tier rates. The District also requires use of recycled water as a condition of potable water service. For existing customers, the conversion to recycled water is provided without charge or fee from the District. Board Policy No. 2 is Appendix A of this report and contains the District policy on recycled water.

Expansion of Recycled Water

MMWD has thoroughly explored ways to expand water recycling. However, with few large users of non-potable water (such as golf courses and heavy industry) combined with MMWD's success in water conservation, have made the district's remaining water recycling options more expensive and less feasible. The more customers improve irrigation efficiency, reduce turf areas, switch to native and drought-tolerant landscapes, and convert parks and athletic fields to artificial turf, the less feasible water recycling becomes. As an example of this effect, the total water entitlement of all recycled water customers connected to the recycled water system is 934 AF. However, typical annual use has dropped to the 650 AF range. This appears to be a by-product of the water efficiency and conservation program, especially the training in water efficiency to local landscape maintenance firms who service both the potable and recycled water irrigation customers.

Another obstacle to water recycling in MMWD's service area is severe saltwater intrusion into the sewer collection systems of most of the local sanitation agencies, including that of the community's largest wastewater agency. Rehabilitation of the sewer collection system was explored, but intrusion is so widespread that the cost to repair the sewers is much more than the cost of the water recycling project. Reducing salt in wastewater using membrane processes has also been explored, but the high cost and increased concentration of contaminants remaining in the wastewater discharge render that alternative infeasible from both a cost and regulatory perspective.

Satellite recycling plants, which can intercept sewage above the zones of saltwater intrusion and process the sewage to tertiary recycled water, appeared to be a promising avenue for enlarging the District's recycled water program. Recently MMWD conducted a study, partially funded through a grant from the California Department of Water Resources, to investigate the viability and cost of incorporating satellite water recycling plants into MMWD's distribution system. However, the study concluded that this approach was technically feasible, but would cost over \$3,000/AF, making it prohibitively expensive.

MMWD continues to investigate the potential for expansion of recycled water, which (along with conservation) is a high priority in the district's vision of sustainable water resource management. However, for reasons cited above, the cost of significant expansion of recycled water is about double that of seawater desalination. MMWD will continue to look for opportunities for recycled water, but it appears that incremental in-fill near our existing recycled water distribution will be the only cost-effective means of expansion.

Recycled Water Use and Future Projections

Projected Use of Recycled Water – Code Section 10633 (d)				
2005	2010	2015	2020	2025
650 AF	710 AF	775 AF	840 AF	900 AF

Further expansion of the District's Las Gallinas system is dependent on future development of nearby St. Vincent/Silvera properties or through costly expansions southward into the service area of the Central Marin Sanitation Agency (CMSA). This expansion will only occur if the cost can be reduced through economic participation from the sanitation agencies or significant grants from state or federal government. While it is clear that wastewater discharge regulations will continue to be more and more restrictive, especially when TMDLs are implemented, the sanitation agencies are not willing to contribute to the cost of expanding the system until forced to by regulation.

The District performed a preliminary design report for a second recycling plant to be located at the CMSA. The study identified approximately 900 acre-feet of potential use in east San Rafael, on the San Quentin Peninsula, and the lower Ross Valley. The sewage collection system for CMSA has extensive and widespread saltwater intrusion that has increased dramatically since the initial planning for this project in 1989. The present salt level averages over 1000 mg/L as chlorides, which is too high for successful irrigation of landscapes. Chloride levels over 250 mg/L are generally toxic to the typical landscape plants in this area.

A *Salt Water Reduction Study* was completed in 1993 which identified the overall condition of the bayside areas of the sewer system and areas of highest saltwater intrusion. This study also identified areas that need to be rehabilitated to maintain the sewer system integrity. Other areas would be rehabilitated to reduce salinity only. Improvements to reduce the salinity level in the sewer collection system would be in excess of \$20 million. Removing the salt through reverse osmosis from the portion of the effluent stream to be used for water recycling would cost about \$3,000 per acre-foot of the water produced. Using membrane processes to remove salt unfortunately increases the concentration of other contaminants in the wastewater discharge raising concerns about regulatory compliance. For all these reasons, a recycled water project in conjunction with CMSA has not been further advanced.

Reliability Planning

Law

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

10631 (4)(c) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable. Provide data for each of the following:

(1) An average water year, (2) A single dry water year, (3) Multiple dry water years.

For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to replace that source with alternative sources or water demand management measures, to the extent practicable.

10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:

10632 (a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages...and an outline of specific water supply conditions which are applicable to each stage.

10632 (b) An estimate of the minimum water supply available during each of the next three-water years based on the driest three-year historic sequence for the agency's water supply.

Reliability

Water Shortage Contingency Analysis

The District developed its current rationing plan in 1999 to recognize its increased ability to import Russian River water through implementation of the initial phases of its Integrated Water Resources Management Program. The change in the rationing plan adjusted the relative levels of use reduction between customer classes to allow some additional water for landscaping in the hopes that the landscaping could exist in a stressed level without dying. In addition, with the ongoing implementation of conservation programs and the effects of demand hardening, a voluntary rationing program at the 10% level was established to preserve water in the early stage of a potential dry period and mandatory rationing is set to begin at the 25% rationing level.

The rationing plan outlined below is designed to fully comply with the requirements of the Urban Water Management Planning Act. The existing code sections pertaining to rationing are included in Appendix B.

Depth and Frequency of Rationing

Due to the level of conservation already practiced by its customers, the District is planning its future water supply such that the depth of mandatory rationing will be of no more than 25% with a frequency of once in 60+ years. The depth of 25% was based on an annual demand of 29,500 acre-feet; the reliable yield of the system when the current code was developed.

**Estimate of the Minimum Water Supply Available during
Multiple Dry Water Years (AF)¹**

Average/Normal Water Year	Single Dry Water Year Year 1	Year 2	Year 3
29,300 ²	26,370	21,975	14,650
% of Normal	90%	75%	50%

¹Three-year minimum water supply (Section 10632 (b)).

² Current reliable yield of the system.

Frequency³

Water Year Type	Year(s) Data is Based Upon
Average or Above Average Water Year	59 years
Single Dry Water Year	8 events
Multiple Dry Water Year	2 events/7 years

³Table based on 74 years of hydrologic record.

Dry Year Water Use Reduction Program

The reservoir operating assumptions modify the way in which the District would operate in response to a future drought. The specifics of the current operational-yield approach that are reflected in the District's Code are:

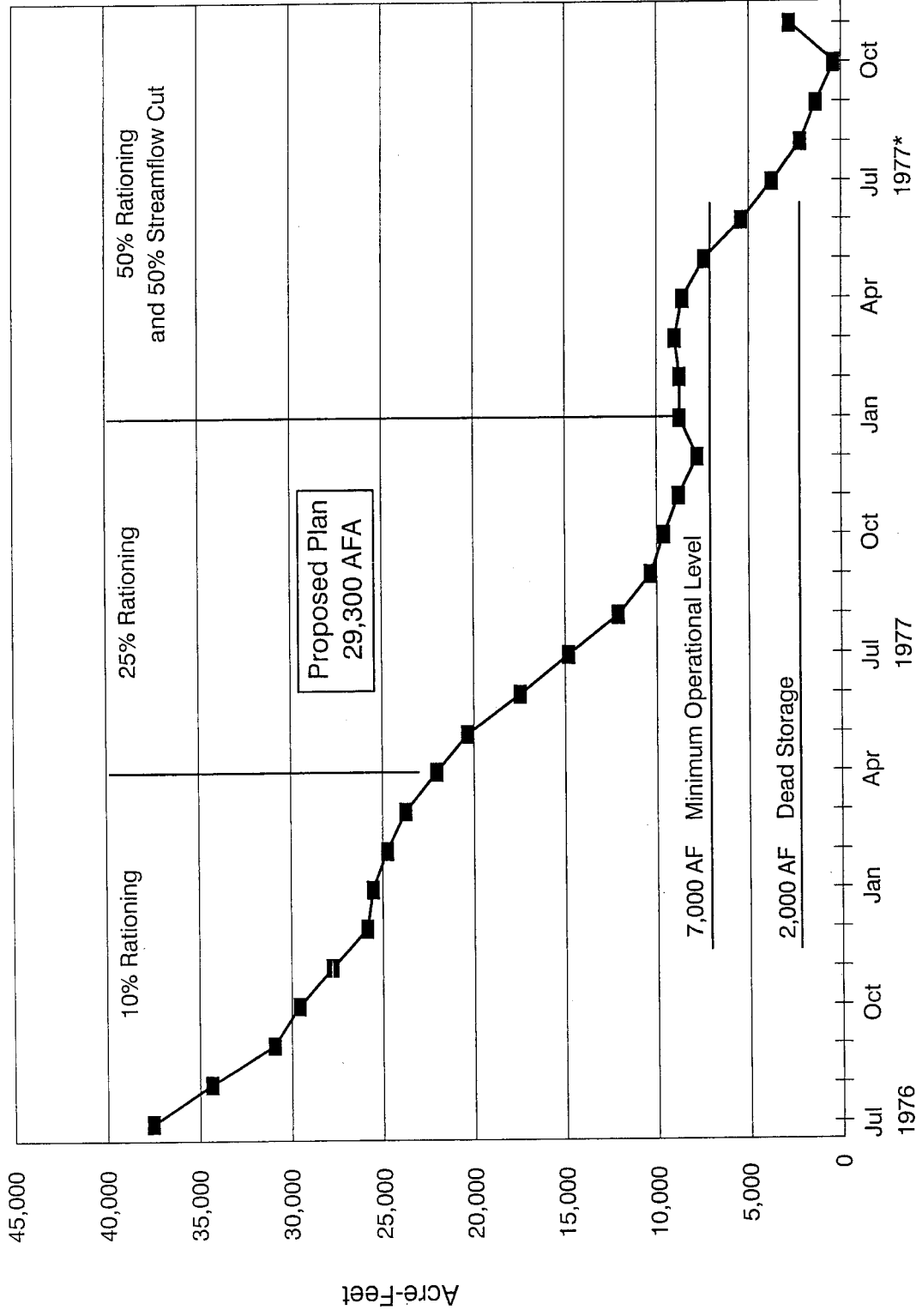
Alert Stage Water Rationing Trigger Point -- (13.02.030 (1)) --The setting of trigger points is a part of the District's process of identifying how it would operate during a future drought. While other water agencies identify their water supply's net safe yield, our District, following the drought of the 1970s, developed an operational yield approach to the evaluation of water supply and then refined it during the early 1990s.

The trigger point for the "alert stage" (voluntary) rationing is set at a total reservoir storage of less than 50,000 acre-feet on April 1. While this storage level is infrequent, it is not that uncommon. In the 66 years studied, there are 5 or 6 years when storage would be low enough to tempt a future Board to implement the alert stage rationing plan, even though all but one of these occurrences will turn out to be false alarms.

The voluntary nature of the alert is seen as a way of making the event palatable to consumers while allowing the message of water conservation to be spread in anticipation of a possible mandatory rationing event. To address the agreed-upon need to keep a high profile for conservation, a more frequent, but lesser use-reduction event, termed the "alert" was developed. This event would happen once every 10 to 15 years and, in order not to trigger an allotment program, would be a voluntary request to reduce use by 10% in preparation for the following year which may be a "once in a lifetime" rationing year. During 1996, the meaning of the alert was expanded to become a reliability component when it was decided that water remaining in storage from the alert stage rationing would be available in the event that the drought were longer than the drought of the 1970s. The reason for considering a drought that was as deep as the 1970s drought and also longer acknowledges that the staff and Board here during a future drought will need to be looking at its resources during the second year of the event, not knowing what level of runoff to expect during the next winter. The "Combined Reservoir Storage, Critical Drought" Chart figure on the next page shows the graphic depiction of the scenario reviewed by the District's Conservation Advisory Committee (CAC) in 1996 when the operational-yield figure of 29,500 acre-feet was chosen. The chart has since been updated to reflect the current reliable yield of the system which is 29,300 acre-feet. The chart looks at reservoir storage over a repeat of the drought of record and shows the effect of extending that drought with a repeat of the hydrology of 1977 (shown as 1977*).

The number of alert events is anticipated to occur on a frequency of once every 10 to 15 years. The actual frequency is difficult to predict since, while there is one event at 48,500 acre-feet that would be below the "official" trigger point, there are several possible events just above the 50,000 acre-feet trigger

COMBINED RESERVOIR STORAGE CRITICAL DROUGHT



1977* - Reservoir storage over the drought of record with the effect of extending that drought another year with the hydrology of 1977 (i.e. hydrology of 1977-1977* is the same hydrology as 1976-1977).

that might be triggered by a cautious staff and Board in the future. For example, the District instituted a mandatory rationing program in 1991 when April 1 storage was 52,500 acre-feet when the District Code did not call for such a response. The April 1 storages in the range from 50,000 acre-feet to 55,000 acre-feet are:

Year *	April 1 Reservoir Storage
1931	52,500 acre-feet
1934	53,000 acre-feet
1939	53,500 acre-feet
1948	54,500 acre-feet

Years shown represent the hydrology of the years and, based on the demand set, the storage is generated by the model. The model uses the 29,300 acre-feet of demand (current operational yield) and the current reservoir and imported water relationships to generate the reservoir storage.

In developing the District's operational yield, staff looked at 74 years of historical hydrologic data. Using this basic data and assuming that existing operational and regulatory constraints remain in effect and that Russian River water deliveries are 8,000 acre-feet annually, computer simulations of system operations were performed. The goal of these simulation studies was to determine how much water the District could prudently provide while requiring mandatory water rationing, at a level of 25%, only once in the period of record. The resulting "system yield" is about 29,300 acre-feet annually.

The worst year in the District's hydrologic history was 1977. Storage on April 1, 1977, using the assumptions above, was determined to be 23,500 acre-feet. The next lowest April 1 storage was 48,500 acre-feet on April 1, 1976. Therefore, an alert stage rationing "trigger", which has no effect on system yield, was set at 50,000 acre-feet, just above the 1976 projection; and the mandatory rationing "trigger" was set at 40,000 acre-feet.

Staff believes that the 40,000 acre-feet alert stage "trigger" is sufficiently below other expected dry year storage levels that mandatory rationing will not be unnecessarily called for. On the other hand, while the mandatory rationing level theoretically could have been set as low as 24,000 acre-feet, it was set much higher to ensure that mandatory rationing was implemented when it was prudent to do so.

The plan, as proposed, will allow the District to meet its consumers' needs during a repeat of past hydrologic conditions. In actual practice, future Boards will react to emergencies as they believe is appropriate. The purpose of developing a plan is to provide some guidance to decision makers, not to limit their options.

While we know that there will be a future drought that is worse than any we have experienced in our brief history, we also know that it is not reasonable to provide supply for a situation which cannot be defined. Therefore, we provide a reliable supply to meet our demand realizing that even during a repeat of the historical period there will be times requiring use reductions by our consumers.

Mandatory Rationing -- (13.02.030 (2)) -- The trigger for the 25% mandatory rationing plan is reservoir storage below 40,000 acre-feet on April 1.

The 25% overall mandatory rationing plan includes differing use reductions by user category:

<u>User Category</u>	<u>Required Use Reduction</u>
Codes 1-5 -- Residential	32%
Code 6 -- Institutional	25%
Code 7 -- Businesses	20%
Code 8 -- Irrigation	50%

The basic philosophy in development of such a cutback table is to generally weigh the uses involved in the various consumer classes and then to set reductions to ensure that basic health and sanitation needs are

met. In considering the cutback of discretionary water uses, such as using potable water for irrigation, are expected to be reduced to a greater extent.

Water Shortage Emergency -- (13.02.015) -- In dry years, the District will consider declaration of a Water Shortage Emergency, as defined in the Water Code, any time that reservoir storage on December 1 is projected to be in the vicinity of, or less than, 30,000 acre-feet. This last trigger is to ensure that we are in position to obtain the instream flow relief from the State Water Resources Control Board that we have assumed we will obtain in dry years. A review of past records indicates that if we adopt this 30,000 acre-foot trigger point to ensure that we obtain instream flow relief in a critical year, we would have been operating under drought-induced Water Shortage Emergencies at least 5 times in the 74 years of hydrologic record that has been reviewed.

Reservoir Storage Level Trigger Points for Rationing

To assess the need for rationing, the District has developed trigger points based on reservoir storage levels on April 1 for each year. The trigger points are updated periodically to respond to changes in the water supply picture, such as implementation of new phases of the IWRMP or new stream release requirements promulgated by the State Water Resources Control Board. As the import of water from sources other than the District's seven reservoirs increases, using trigger points based entirely on lake levels may not be appropriate.

ALLOCATION PLAN

The programs for rationing levels from 20% to 50% are outlined in the table below. As in past rationing programs the District has implemented, census cards will be used to determine single and multi-unit residential populations for all levels of mandatory rationing.

**TABLE – Allocation Plan
Proposed Cutbacks at Different Rationing Levels**

<u>Billing-codes</u>	20% Rationing	25% Rationing	30% Rationing	40% Rationing	50% Rationing
Billing-code 1-5 (Residential)	25%	32%	32%	46%	55%
Billing-code 6 (Institutional)	20%	25%	30%	40%	50%
Billing -code 7 (Business)	15%	20%	25%	35%	45%
Billing-code 8 (Irrigation)	45%	50%	60%	75%	90%

20% and above RATIONING PLAN: Per Capita/Service Allotments

A "Per Capita/Service Allotment" approach should be implemented when a consumption reduction above 20% is necessary.

Residential services will receive an allotment based primarily on the number of people per household. Census cards will be used to determine number of people per household

The plan at these levels recognizes that a small amount of water will be available for household needs or the maintenance of critical landscaping. In addition to the per capita allotment, an allotment of approximately 2 ccf's per water service will be allocated.

Nonresidential services will receive an allotment that will be a percentage reduction of their water budget.

Recycled water services will not be required to reduce water use as long as sufficient recycled water is available.

Prohibitions, Consumption Reduction Methods and Penalties

Law

10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:

10632 (d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.

10632 (e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.

10632 (f) Penalties or charges for excessive use, where applicable.

District's On-Going Water Waste Prohibitions.

(1) The District has regulations requiring that no customer of the district shall make, cause, use or permit the use of potable water from the district for residential, commercial, industrial, agricultural, governmental or any other purpose for the following nonessential uses:

(A) The washing of sidewalks, walkways, driveways, parking lots and all other hard-surfaced areas by direct hosing, except as may be necessary to properly dispose of flammable or other dangerous liquids or substances or to prevent or eliminate materials dangerous to the public health and safety;

(B) The escape of water through breaks or leaks within the consumer's plumbing or private distribution system for any substantial period of time within which such break or leak should reasonably have been discovered and corrected. It shall be presumed that a period of forty-eight hours after the consumer discovers such a leak or break, or receives notice from the district of such leak or break, whichever occurs first, is a reasonable time within which to correct such leak or break;

(C) Nonrecycling decorative water fountains

(2) Restrictions on Irrigation. Irrigation shall not be conducted in a manner or to an extent that allows water to run off or overspray the areas being watered. Every consumer is deemed to have his water distribution lines and facilities under control at all times and to know the manner and extent of his water use and any runoff. Facilities with timed controllers shall adhere to the schedule set forth in District Code Section 11.60.050.

(3) Restrictions on Reverse-Osmosis Units. The installation of reverse-osmosis water purifying systems not equipped with an automatic shutoff unit is prohibited.

(4) The following are prohibited for new connections:

(A) Single-pass cooling systems for air conditioning or other cooling system applications unless required for health or safety reasons;

(B) Nonrecirculating systems for conveyer carwash applications.

Water Waste Prohibitions in Dry Periods

Twenty-five Percent or Greater Water Use Reduction Program

Every consumer shall eliminate water wastage and non-essential use of potable water from the district in an effort to aid the district in achieving a twenty-five percent reduction in the amount of water used by all consumers in the last year in which no restrictions in water use were required.

Additional Prohibited Nonessential Uses Applicable to All Consumers

Use of potable water for: refilling or as make-up water for decorative fountains or pools; irrigation between the hours of 11 AM and 7 PM; irrigation of new turf areas; washing of cars, boats, airplanes with hose without a shut-off nozzle; or serving water to restaurant patron except on request.

Penalties

Any customer violating the regulations and restrictions on water use set forth above shall receive a written warning for the first such violation. Upon a second violation, the customer shall receive a written warning and the District may cause a flow restrictor to be installed in the service. If a flow restrictor is placed, the cost of installation and removal shall be paid by the violator. Any willful violation occurring subsequent to the issuance of the second written warning shall constitute a misdemeanor and may be referred to the Marin County district attorney's office for prosecution. The district may also disconnect the water service. If water service is disconnected, it shall be restored only upon payment of the turn-on charge fixed by the District Board of Directors.

Variances to Dry Period Regulations

Variance requests must be submitted in writing to the District and include the account name, service number, and service address.

Residential Customers

- Medical hardship - requires letter from physician supporting applicant's request.
- For business use in home - requires copy of business license.

Commercial, Institutional, and Other Uses

Requests will be considered when the customer can show that severe financial handicap will occur without additional water. The written request should include a statement addressing the following:

- 1) What has been done to reduce consumption;
- 2) Why is the customer unable to further reduce consumption;
- 3) How much water the customer needs.

In granting variances, water saving retrofits or modifications may be required if deemed practical by District personnel. For example, a licensed home day care center may be required to retrofit 1.6 gallon ULF toilets and flow restricting faucet aerators before being granted a variance allotment.

Variances will not be granted for:

- home businesses without a business license;
- temporary residents (less than 6 months);
- pets or livestock (except cattle and horses);
- gardening or landscaping needs;
- parks or athletic fields;
- normal expansion of a business or institution.

Water Banking

Water banking, i.e., carry over allotments from one billing period to another, will be allowed. Consumers will be allowed to bank water for one calendar year only. No carry over into subsequent years should be allowed.

Penalties

Appropriate rate penalties will be developed and presented to the Board at the time of rationing program implementation. In addition to financial penalties, these may include installation of flow restrictors and shut-off of service.

Support Programs

Rationing will be supported by aggressive campaigns of public information, water saving retrofit incentives, and technical support.

Financial Impacts

Water service is billed by the District using a four tier rate structure for water consumption and a fixed rate meter service charge. The meter service charge is based upon the size of the meter serving the customer's account. Reserve minimums have been set at a level equal to six months of District operating costs.

Predetermined storage levels will trigger set water use reduction goals. These reductions will have an adverse effect on revenues and available reserves. The District recognizes the operational costs often rise in time of drought because of the level of customer service activities required and increased water management costs. At the time the water use reduction program goes into effect, the District will, by existing District ordinance requirements, review its reserve balances to determine if a change in the rate structure is fiscally warranted. The District does not have a Rate Stabilization Fund.

In the drought of the 1987-1992, the District established a five tier rate structure to encourage conservation. If necessary, a similar rate structure may be considered in future rationing periods.

Water Shortage Contingency Plan

Preparation for Catastrophic Water Supply Interruption

Law

10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:

10632 (c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.

Water Shortage Emergency Response

In 1999 the District updated its emergency response plan in preparation for the advent of the year 2000 and the various possible energy shortage scenarios suggested by the Y2K event. The emergency response plan was updated again in 2004. As a portion of these preparations the District has emergency response generators that can power a variety of small to medium sized pump stations throughout our service area. To accept the power from the emergency generators, the District has retrofitted more than half of its pump stations. The remaining stations can be bypassed for gas pumping or have emergency generators on site.

The District is in a seismically active area and developed a seismic strengthening program for its treatment and transmission system in 1995. The seismic strengthening is also linked to providing water for fire suppression needs following a significant seismic event and was folded into the District's Fire Flow Master Plan (FFMP). The FFMP is being implemented over a 15 year period and currently is one-half complete.

During a declared shortage, the District issues notifications to conserve water to its customers. If the length of service interruption is going to be for an extended period of time the District determines if the situation is localized or widespread and develops a plan to provide water for health and safety during the situation.

Supplemental Water Supplies

During extended periods of water shortage the District has worked with other water suppliers to provide modest amounts of water to ultimately reduce the overall level of cutback in water use required of the District's customers (see next chapter). Even with the additional supplies the District requested a 57% use reduction of its customers during the drought of the 1970s. As mentioned previously, the District is also evaluating desalination as a supplemental supply.

Transfer or Exchange Opportunities

Law

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

10631 (d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.

Water Transfers

During the droughts of the 1970s and the late 1980s, the District made use of water transfers to augment its supplies. During the drought of the 1970s, an emergency pipeline was laid to bring in an emergency water supply from the State Water Project via East Bay MUD's delivery system. During the late 1980s and early 1990s, the District drew surplus water through its supply connection with the Sonoma County Water Agency. The temporary connection with East Bay MUD was removed from the Richmond-San Rafael Bridge in the early 1980s. The Sonoma County Water Agency water delivery system is currently under a state of impairment and is not projected to be able to deliver above our current supply level for at least the next five years.

Water Use Provisions

Law

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

10631 (e) (1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors including, but not necessarily limited to, all of the following uses:

(A) Single-family residential; (B) Multifamily; (C) Commercial; (D) Industrial; (E) Institutional and governmental; (F) Landscape; (G) Sales to other agencies; (H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof; and (I) Agricultural.

(2) The water use projections shall be in the same 5-year increments to 20 years or as far as data is available.

Past, Current and Projected Water Use

A general overview of use within the District's service area shows a general upward trend in population and consumption to the early 1970s. The District's water conservation efforts of the early 1970s coupled with the need to reduce consumption during the District's drought of record during the mid-1970s quickly reduced use for a period of time. While the District's customer base has increased by more than 20% and the population increased by more than 10% between 1970 and 2004, use in 2004 was essentially the same as use in 1970 due to a variety of water conservation efforts now in place.

POPULATION AND CONSUMPTION TRENDS WITHIN THE MARIN MUNICIPAL WATER DISTRICT SERVICE AREA		
Year	Population	Water Production (potable & recycled)
1940	48,000	3,989 acre-feet
1950	78,000	9,207 acre-feet
1960	124,000	19,334 acre-feet
1970	168,000	32,530 acre-feet
1980	167,000	27,313 acre-feet
1987*	168,000	32,837 acre-feet
1990	170,000	29,122 acre-feet
1995*	176,000	28,350 acre-feet
2000	185,000	31,165 acre-feet
2004	190,000	32,478 acre-feet

*Years shown are pre- and post-drought of the late 1980s and early 1990s

The following table summarizes the consumption history for all customer classes for the last five years.

Table of Consumption History
Five Year Consumption History by Customer Class

Service Type	2000	2001	2002	2003	2004
Single-Family (No. Services)	16,002 af (51,466)	16,530 af (50,943)	16,446 af (50,070)	16,062 af (51,359)	16,568 af (51,435)
Duplex (No. Services)	748 af (2,240)	766 af (2,212)	748 af (2,200)	726 af (2,215)	748 af (2,224)
3 & 4 Units (No. Services)	414 af (797)	410 af (791)	394 af (777)	378 af (782)	376 af (780)
5 - 9 Units (No. Services)	786 af (792)	788 af (785)	749 af (770)	725 af (766)	736 af (766)
10+ Units (No. Services)	2,034 af (650)	2,015 af (645)	1,979 af (645)	1,940 af (652)	1,951 af (652)
Institutional (No. Services)	2,198 af (287)	2,096 af (261)	2,095 af (256)	1,756 af (237)	1,854 af (237)
Business (No. Services)	3,449 af (3,327)	3,394 af (3,330)	3,280 af (3,316)	3,175 af (3,332)	3,200 af (3,326)
Landscape (No. Services)	2,613 af (1,250)	2,849 af (1,277)	2,738 af (1,292)	2,513 af (1,315)	2,653 af (1,309)
Total Billed Use	28,244 af	28,848 af	28,429 af	27,275 af	28,086 af
Adjustments	205 af	295 AF	336 AF	303 AF	326 AF
Unaccounted (1)	2,605 af	3,449 af	3,577 af	3,608 af	3,139 af
Production (2)	31,165 af	32,427 af	32,006 af	30,883 af	32,478 af
Recycled (3) (No. Services)	687 af (297)	774 af (301)	789 af (316)	684 af (316)	720 af (322)

(1) Includes unaccounted for losses & uses not billed – e.g. temporary taps, water quality samples.

(2) Production is based on daily flows and does not equate to the total of billed, adjusted and unaccounted water.

(3) Consumption and number of services are incorporated in customer classes listed above.

Past, Current and Projected Water Use ¹								
	1990	1995	2000	2005	2010	2015	2020	2025
Potable & Recycled Use	29,122	28,350	31,165	30,000	32,500	33,600	34,200	34,700
¹ Total Billed Use Unit of Measure: Acre-feet/Year Projections based on current unit water use factors.								

WATER QUALITY

Law

10634. The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management and supply reliability.

Water Quality Impacts on Supply Reliability

MMWD is fortunate to have water of exceptionally high quality and has never exceeded a water quality regulatory limit or received a regulatory violation. Five of the seven local surface water reservoirs are located in a District-owned protected watershed that substantially reduces the potential for contamination. The two reservoirs outside the protected watershed are located in rural areas with low population densities that are maintained by strict zoning requirements. In addition, the MMWD has established Watershed Protection Agreements with landowners in these watersheds. Accordingly, the high water quality that MMWD has historically enjoyed is expected to continue into the future. There have been no instances when water quality issues have limited water supply or affected reliability.

Water Quality and Water Management Strategies

As stated above, water quality has not limited MMWD's water supply and this trend is expected to continue. The largest impact to water quality in MMWD's surface water reservoirs is algal blooms that can create taste and odor problems. Algal taste and odors are created from certain species of blue-green algae that secrete musty, earthy taste and odor compounds (Geosmin or MIB) which can be detected by sensitive humans in concentrations as low as 2 parts per trillion. This is an aesthetic problem only as there are no health concerns about Geosmin or MIB. The MMWD manages algae blooms through lake monitoring in the Summer and Fall. When necessary, the species of algae that create taste and odor problems are controlled through the careful application of copper sulfate. MMWD has plans to perform pilot testing of activated carbon in both the powdered and granular form to test the effectiveness and cost of this additional taste and odor management tool.

Salt Water Intrusion Reduces the Potential for Water Recycling

As described elsewhere in this report, MMWD has developed an extensive program of recycled water in the Las Gallinas area of the District. We have investigated the feasibility of building water recycling systems in other areas as well, none of which are economically feasible without the financial participation of wastewater agencies. An additional constraint to water recycling is saltwater intrusion into low-lying areas of the sewer collection systems that renders the water too salty to use for landscape irrigation, the primary market for recycled water in this area. MMWD's existing recycled water system is also vulnerable to salt water intrusion if an earthquake were severe enough. Most of the low-lying areas subject to saltwater intrusion are located in soil conditions that would experience differential settlement in an earthquake and allow further saltwater inflow into the sewage collection system.

Desalination of Bay Water and Water Quality

MMWD is in the early stages of operating a desalination pilot plant to evaluate desalting San Francisco Bay water for potable use, as described elsewhere in this report. Although it will be some time before the final report on the pilot plant is completed, early indications are that, with pre-treatment, desalting Bay water with reverse osmosis will meet regulatory compliance requirements for water quality.

Supply and Demand Comparison Provisions

Law

10635 (a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from the state, regional, or local agency population projections within the service area of the urban water supplier.

Supply and Demand Comparison

The table below compares current and projected water supply and demand. It indicates that the District is currently in a deficit and that deficit is projected to grow over time. As noted in this report, the District has several options under its UWMP for eliminating the deficit and has been actively reviewing those options for the past five years.

Projected Supply and Demand Comparison (AF)					
	2005	2010	2015	2020	2025
Supply Availability	29,300	28,800	28,300	27,800	27,300
Demand Projections	30,000	32,500	33,600	34,200	34,700
Difference (Deficit)	(700)	(3,700)	(5,300)	(6,400)	(7,400)

The current deficit means that the District is relying more heavily on its local supplies than it would like. Therefore, in a repeat of the drought of record the District will have to request/require use reductions at higher levels than shown in the chapter on Reliability Planning.

The District believes that additional water efficiency/demand management improvements and additional water supply will be necessary to meet its projected water demand. The District will continue to implement water efficiency/demand management improvements as it examines supply enhancement options, including bay water desalination, additional water recycling, and additional imported water supplies.

Supply and Demand Comparison for Normal and Dry Years (AF)					
Water Supply Sources	Average/ Normal Water Year	Single Dry Water Year	Multiple Dry Water Years		
			Year 1 90%	Year 2 75%	Year 3 50%
Supply Totals	29,300	26,370	26,370	21,975	14,650
Demand Totals	31,500	31,500	31,500	31,500	31,500
Difference	(2,200)	(5,130)	(5,130)	(9,525)	(16,850)

Water Demand Management Measures

Law

10631 (f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:
(1) A description of each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following:.....

The Marin Municipal Water District's programs for demand management through water conservation began in 1971 when water conservation literature from the American Water Works Association was inserted into water bills. By the mid-1970s the District's programs had expanded to include retrofits of water-using fixtures and has continued to expand over the following thirty-five years.

When the District was embarking on its Integrated Water Resources Management Program in 1991, a review of demand found that an estimated 11% reduction in water use had occurred during the period from 1970 to 1987 after taking into account the additional services installed during the period. A similar review took place in 1999 and found that the demand had been reduced by an estimated 25% during the period from 1970 to 1998.

The District is a charter signatory to the Memorandum of Understanding regarding Urban Water Conservation in California (MOU) and is an active member of the California Urban Water Conservation Council (CUWCC). The District's Annual Report for 2003-2004 to the CUWCC can be found in Appendix C of this report.

The District's Water Conservation Coordinator and staff of 6-8 employees handle a wide variety of water conservation/demand management programs. The staff is augmented by seasonal hires to handle some of the programs and all District employees assist with identifying customers who can benefit from our programs.

The following is a listing of the major programs undertaken by the District during 2000-2005.

Demand Management Department 2000-2005 Major Water Conservation Programs/Activities

1. Water Survey Programs for Single-Family and Multi-Family Residential Customers

Program Description:

We are entering our tenth year of offering water surveys to single- and multi-family customers through the Conservation Assistance Program (CAP). CAP has been an instrumental part of our water conservation efforts since 1995, allowing staff to educate CAP participants about indoor and outdoor water saving opportunities, inform them on various District incentive programs, provide valuable water conservation literature and disseminate low water-use devices. CAP targets the top 20% of high water users through direct-mail marketing and provides a free, comprehensive indoor and outdoor water-use consultation of the property.

CAP is marketed in direct mailings that closely follow the arrival of the water bill. Consultation activities include the following: checking for leaks; measuring showerhead and aerator flow rates with a follow-up offer to replace with low-flow fixtures; recommending replacement of toilets with ULFTs where

necessary; recommending replacement of clothes washers with high-efficiency models, where appropriate; evaluation of irrigation system and irrigation schedule; providing literature and evaluation results.

Status:

From 2001-2005, the CAP has conducted over 1,826 single-family residential (SFR) and 545 multi-family residential (MFR) water-use consultations, resulting in an estimated water-use savings of 248 acre-feet.

Water Savings:

2001-05 water savings: 248 acre-feet.

Water savings potential: 23 acre-feet per year

Table 1. Water Surveys for SFR and MFR - Actual

Actual	2001	2002	2003	2004	2005 (projected)	Total
# of single family surveys	639	467	323	47	250	1,826
# of multi-family surveys	133	399	0	0	13	545
Actual water savings – AFY ¹	55	59	56	48	30	248

Table 2. Water Surveys for SFR and MFR - Projected

Planned	2006	2007	2008	2009	2010 (projected)	Total
# of single family surveys	200	200	200	200	200	1,000
# of multi-family surveys	0	0	0	0	0	0
Projected water savings – AFY ¹	23	20	21	23	23	110

¹ -We assume water savings do not occur until the year after the survey occurred and decay at a 25% rate per year. 2001 values based on analysis of CAP performed in 2002; 2002– 2005 values were calculated using CUWCC default values.

2. Residential Plumbing Retrofit

MMWD has been distributing free low-flow showerheads, faucet aerators, and other water-saving devices since 1991. In 1991, MMWD passed Ordinance 326 which required the installation of ULFTs, low-flow showerheads and aerators. Showerhead and aerator retrofits and distributions occur with CAP water use surveys (BMP 1).

Table 3. Distribution of Water-Conserving Devices

Device	Qty 2001-2005	Qty pre-2001	Qty Total
Low-flow showerheads	9,500	64,200	73,700
"Shorter Shower" timers	5,000	0	5,000
Faucet aerators	5,000	8,400	13,400
Toilet leak detection tablets	2,500	0	2,500

3. System Water Audits, Leak Detection and Repair

MMWD conducts an audit of the distribution system annually. MMWD's distribution system includes over 900 miles of pipe. Several methods are used to locate leaks including visual inspections, sonic leak detection, and customer reports. All valve-persons are equipped with sonic leak detection equipment which is utilized to locate pipe leaks.

4. Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections

MMWD requires meters for all new connections and bills for water use according to its tiered block rate structure.

5. Large Landscape Programs and Incentives

The District has an on-going landscape water survey program, as well as several rebate incentive programs for water-saving devices and landscape changes. In addition, the District developed a landscape plan review ordinance in order to promote efficient equipment choices and design.

A. Large Landscape Water Surveys

Program Description:

Large landscape water surveys are performed on accounts that exceed their baselines by 20%. The goal of the program is to market customers through direct mailings every spring and follow through by evaluating the irrigation system to identify inefficiencies, and reviewing the landscape maintenance contractor's practices for applying irrigation water to the landscape. Based upon the findings at the site, the District may offer financial incentives to the District customer to help defray the cost of implementing and upgrading the site's irrigation distribution system and increase its operational efficiency.

Status:

Over the past four years, the large landscape program has not been actively marketed due to lack of staffing. Currently staff is focusing their efforts on the installation and monitoring of the ET Controller Pilot Program. As the ET Controller program stabilizes, the large landscape program will be re-instituted for a portion of the 2005 irrigation season.

Water Savings:

Based on a 25% participation rate of the top 20% of large landscapes and using projected savings of .22-.44 acre feet per site, water savings of 11 to 22 acre-feet per year could be realized.

B. Evapotranspiration ("ET") Controller & MP Rotator Rebate Program

Program Description:

In 2001 - 2002, staff conducted a two-year ET Controller Pilot Study on 18 residential and light commercial sites. Pilot sites realized an average 27% water savings by installing ET controllers. As a result, staff began implementing an ET Controller Rebate Program in 2005.

The ET Controller Rebate Program provides a rebate to customers who upgrade their irrigation controller to a weather-based or "ET" irrigation controller. ET Controllers adjust watering schedules automatically based upon either site specific or transmitted ET values. To qualify to participate, a customer's irrigation system must meet efficiency standards, which include: distribution uniformity of 65% for turf and 55% for non-turf areas; matched precipitation rates within each valve circuit; separate valves for each hydrozone; check valves; and an automatic rain shut-off device.

In addition, the customer must have: water use in Tier 3 or Tier 4; a minimum of 6,000 (residential) or 10,000 (commercial) square feet of irrigated landscape; a working in-ground irrigation system that is operated by a working controller.

A \$20 incentive is offered for every working valve that is connected to the new controller. Additionally, we offer \$4 for every spray nozzle retrofit to a new MP Rotator nozzle or equally performing nozzle that has a matched precipitation rate of .06 inches of water and improves the distribution uniformity.

Status:

To date, 12 applications have been received. Program participants are in the process of performing irrigation system improvements which must be completed before the installation of an ET controller.

Water Savings:

Based on the 27% water savings of our pilot study, the District could save between .18 to .23 acre-feet per year for residential sites and 1.3 to 1.6 acre-feet per year for commercial sites.

C. Central Irrigation Controller System (CICS) Share-ware Program

Program Description:

In spring of 2001, staff investigated the water saving potential for the acquisition of a CICS for managing the irrigation systems at District facilities and other public/private customers with multiple landscaped sites under their jurisdiction (i.e. schools, municipalities, parks and golf courses). CICS uses water budgeting features, tracks water consumption, reads ET and adjusts controller value run-times accordingly, records flow and use, and shuts down any station with irregular readings. Reports generated from a CICS will provide information necessary to manage water consumption.

Status:

Due to staffing issues, the program was not implemented as originally planned. In 2006, we expect the CICS to be installed at two District facilities – San Geronimo Treatment Plant and the Administration Building on Nellen Avenue in Corte Madera. We will market our Share-Ware Program to interested customers and assist those customers with an incentive to convert their conventional controllers to a CICS controller. The District will also provide funds to assist other CICS users to allow for expansion of their existing CICS. The participating customer can realize up to a \$1,000 incentive for installing a CICS controller. Training by the manufacturer will be offered at no charge to those customers that wish to participate in the CICS Share-Ware Program.

Water Savings:

The landscape industry is finding in excess of 20% water savings by installing a CICS. The amount of water saved will vary depending on the number of customers choosing to participate.

D. Artificial Playing Surface Rebate Program

Program Description:

The program offers financial incentives of \$15,000 for every acre of natural turf converted to artificial playing surface.

Status:

Since its implementation, the District has granted incentives of about \$75,000 toward the installation of artificial playing surfaces to two schools, Marin Catholic and Marin Academy. In 2003 the two sites collectively saved 10.13 acre-feet.

Water Savings:

The water savings potential for removing cool season turf and replacing it with artificial playing surface is estimated to be 3.5 acre-feet of water per acre annually.

E. Landscape Plan Review OrdinanceProgram Description:

In the interest of ensuring the efficient use of landscape water, the District developed Landscape Ordinance 385, which was adopted by the board of directors on March 3, 1999. The District's Landscape Ordinance provides a guide for landscape professionals in designing and installing water-wise landscapes and efficient irrigation systems. MMWD works cooperatively with the County of Marin and cities within MMWD's service area by providing Ordinance 385 review of landscape plans submitted to local agencies for permit approval. While these agencies may have their own landscaping requirements, the MMWD Ordinance 385 review is usually more rigorous and water service for new projects will not be granted until the requirements of the ordinance are met.

The Ordinance has had three procedural revisions since it was originally adopted in 1989. The first three ordinances were 263, 285 and 326.

Status:

A total of 234 landscape projects have been reviewed since 2000. Staff has reviewed over 500 landscape projects since the first Ordinance was adopted in 1989.

Water Savings:

Evaluating water savings for this activity is extremely difficult. Many of the projects reviewed are new sites and, as such, do not have a past history of water use to compare savings. The remaining projects are sites that involve significant changes to the landscape (i.e. increasing irrigated areas, changing plant types, etc.), making pre- and post-project comparisons extremely difficult and, at times, not possible.

6. High-Efficiency Clothes Washing Machine Financial Incentive ProgramsProgram Description:

The District began offering \$75 residential clothes washer rebates in 1996. Beginning in December 2001, as a partner in the Bay Area Regional Water Utility Clothes Washer Rebate Program, the District was able to increase the rebate to \$150, with the additional \$75 per rebate coming from a DWR grant. Through a contract administered by the Electric and Gas Industry Association, the District was allotted \$103,125 of DWR funds, enabling the District to offer a total of 1,375 \$150 rebates. As of December 31, 2002, the District's portion of DWR funds was depleted and the District once again offered a \$75 rebate. In 2004, the District stopped offering rebates for the least efficient models of high-efficiency washers and increased the rebate amount for the highest efficiency models to \$100.

Status:

Over 6,100 high efficiency clothes washers have been installed from 2001 - 2005.

Table 4. High Efficiency Clothes Washer Rebates

Actual	FY01	FY02	FY03	FY04	FY05	Total
\$ per rebate	\$75-\$150	\$75-\$150	\$75	\$75 - \$100	\$75 - \$100	-
# of rebates paid	772	1,209	1,482	1,488	1,192	6,143
Water savings – AF/Y	7	11	13	14	13	58

Water Savings:

1. Total water savings: 58 acre-feet for 2001-2005 washers; 77 acre-feet per year for all washers since program inception.
2. Additional annual water saving of 15 acre-feet per year is expected, based on 1,200 retrofits per

year and average water savings of 11 GPD/washer.

7. Public Information Programs

Program Description:

The Public Information Officer and Conservation staff develops information and materials to support a broad range of public information activities. A conservation-related article is included in each issue of "On the Water Front", a newsletter distributed to all customers with the water bill. In addition, MMWD regularly promotes conservation programs via the media with both editorial pieces and paid advertising. Additional examples include the following:

A. Water Efficient Landscaper (WEL) Program

Program Description:

Initiated in 1997, the WEL program provides training to interested landscape contractors regarding the District's landscape water conservation codes, billing policies, troubleshooting and repair of irrigation systems, and fundamental aspects of water management. The training is free and a list of WEL participants is distributed to interested Conservation Assistance Program participants, as well as attendees of the District's irrigation seminars and is available on the District's web site.

Status:

A total of 105 landscape professionals have participated in our program since 1997. Currently, 48 landscape professionals are actively participating in this program.

B. "H2O How-To" Water Wise Fair

Program Description:

In 2004, the District began offering this special event which features the latest in water-saving technology and tips from experts. The fair includes dozens of exhibits, classes, consultations with landscaping professionals, children's activities and more. Examples of offerings include:

- ◆ Exhibitor displays on the latest in water-efficient equipment
- ◆ Free classes on water-efficient gardening and related topics taught by experts in the field
- ◆ "Ask the Experts" booths staffed by professional landscape architects and landscape contractors
- ◆ "How To" demonstrations on making your garden water-efficient
- ◆ Hands-on practice with assembling irrigation equipment
- ◆ Free product samples and other giveaways

C. Residential Landscape Seminars

Program Description:

Since 1995 staff has offered a variety of free water-efficient gardening seminars for homeowners. The seminars are designed especially for the home gardener who wants to learn more about water wise gardening techniques and technologies. Examples of the series include:

- ◆ Drip Irrigation Workshop
- ◆ Plants for a Beautiful Low-Water-Use Garden
- ◆ Winterizing Your Garden

- ◆ Principles of Water-Efficient Gardening
- ◆ Drip Irrigation Workshop
- ◆ Understanding Sprinkler Irrigation Systems

Status:

The “stand-alone” seminars have been incorporated into the District’s “H2O How-To” Water Wise Fair.

D. Water Management Workshops for Landscape Professionals

Program Description:

Since 1998, staff has presented water management workshops to the English speaking landscape professionals that manage properties in our service area. The goals of these workshops are to reduce landscape water consumption and waste through increased knowledge regarding the management and scheduling of irrigation systems.

Status:

In 2002, we also began offering the water management workshop in Spanish. We are targeting the Hispanic landscape professionals because we have collected information from our CAP analysis which indicates that many of the CAP participants have Hispanic landscape professionals operate their irrigation controllers. Our goal is to increase irrigation controller programming knowledge to landscape professionals to reduce the amount of over-irrigated landscapes.

E. “Words to the Water Wise” Newsletter

Program Description:

“Words to the Water Wise” provides irrigation reminders and updates on irrigation scheduling and other tips on residential water conservation (beginning, middle and end of the irrigation season) to CAP participants.

Status:

Staff published two issues in 2001 to approximately 1,500 CAP participants from the last three years. While the water savings potential is difficult to estimate the goal of the newsletter is to slow the erosion of the water saving achieved from their CAP consultation, by providing regular water conservation reminders. Due to staff resources being allocated to new programs, this Newsletter has been discontinued.

F. Water Wise Landscape Contest

Program Description

Since 1995 the District has sponsored an annual Water Wise Landscape Contest to recognize the efforts of our residential and non-residential customers who conserve water by using low water use plants, and installing efficient irrigation technology to create beautiful landscapes. Citizen Advisory Committee members and staff judge the landscape contest entries.

Status:

The contest was discontinued in 2004 due to lack of contest entries. Staff plans to advertise for entries in 2006.

G. Marin County Fair

Program Description:

The District has participated in the Marin County Fair since the 1980's. Outdoor booths are staffed to advertise the District's various conservation programs and to provide information on efficient irrigation principles and new irrigation technologies.

Status:

This is an on-going event that will continue.

H. Watering Schedule on the District's "Water Saver Tip Line"

Program Description:

In 1990 a dedicated telephone line was established to provide customers access to pre-recorded weekly evapotranspiration values and watering schedules for their landscape in the three main climatic zones of the County. The telephone line also provides the caller with the choice of obtaining Program Description information explaining how the watering schedules were calculated. The Tip Line is offered in English and Spanish.

Status:

Ongoing.

I. Recommended Watering Schedules via E-mail

Program Description:

An e-mail reminder is sent out every Friday morning during the irrigation season to those customers expressing interest in obtaining weekly watering schedules.

Status:

During the irrigation season, weekly e-mails providing links to our web site are sent to approximately 165 customers as reminders to change their watering schedules.

J. Water Conservation Web Page

Program Description:

Updates and modifications are continually being performed to our Water Conservation web pages, especially to sections relating to single-family homeowners. During the irrigation season, web pages are updated every Friday with suggested watering schedules.

Status:

The web pages are continually being updated to reflect changing information relating to water conservation activities (e.g., seminar schedules, rebate programs, etc).

K. Water Wise Gardening CD

Program Description:

In 2004, the District partnered with the Sonoma County Water Agency to produce the "Water Wise Gardening" compact disk. The Water Wise Gardening CD contains helpful information on gardening with water wise plants and other great water-saving ideas. This exceptionally beautiful and user-friendly CD includes detailed information on over 1,000 varieties of water wise plants, such as groundcovers, shrubs and trees, specifically geared to gardening in our local Mediterranean climate. The extensive garden design feature includes watering schedules and guidelines by locale.

Status:

Approximately 150 CDs were distributed to local libraries and video stores. Anyone interested may rent the disk for free, load it on their home personal computer, and then return it for others to use. CDs are also distributed at the Marin County Fair, "H2O How To" Water Wise Fair, and other special events and from the District office.

L. Water Wise Plant ProgramProgram Description:

The "Water Wise Plant" educational program was developed in 2003. The program offers colorful stickers and other materials to local nurseries (free of charge) to identify low-water-use plants. The goal of this program is to increase our customers' awareness of water wise plants and how to identify them when they are plant shopping at their favorite local nurseries.

Status:

We continue to supply plant stickers and related signage to local nurseries.

8. School Education Programs

MMWD's water education program for schools includes the following:

- Water education workbooks for grades K-8, and a water education booklet for grades 9-12, free to all schools in our service area
- Service-learning field trips to the MMWD watershed for 3rd grade classes
- Grants for watershed improvement projects
- Special presentations and tours of MMWD facilities as available
- Teacher newsletter that features MMWD programs as well as information about other environmental education resources

9. Conservation Programs for Commercial, Industrial and Institutional (CII) Accounts

The District offers a wide variety of programs to CII customers. These include water use surveys, toilet replacement programs, clothes washer and dishwasher rebate programs, and pre-rinse spray valve replacements. In addition, all CII and dedicated landscape accounts are assigned water entitlements and water budgets under the District's non-residential rate structure.

Table 5. CII Accounts Breakdown by Sector	
CII Sector	# of Accounts
Commercial	3,261
Industrial	28
Institutional	240
Total	3,529

A. "Rinse & Save" Pre-Rinse Spray Valve Installation ProgramProgram Description:

Between November, 2002 and October, 2004, the District participated in the Rinse & Save program. The program is managed by the California Urban Water Conservation Council (CUWCC) and funded by the California Public Utilities Commission (CPUC) through funds collected by the Public Goods Charge, and by participating water agencies throughout California.

The state-wide goal of the Rinse & Save program was to install water- and energy-efficient pre-rinse spray valves in food service establishments throughout California at no cost to the business.

or property owner. Pre-rinse spray valves are used to rinse plates, cookware, etc. of large food deposits before the items are placed in a dishwasher. Installed valves are rated at 1.6 gallon-per-minute; only spray-valves using over 1.6 gallons-per-minute are replaced through this program. The CPUC provided \$131.00 per installed valve and the District contributed \$50.00 per installed valve for installations within the District's service area.

Status:

The District retrofitted a total of 414 pre-rinse valves through this program and ended its participation in the program in 2004.

Water Savings:

The total annual water savings resulting from the program's 414 valve installations is estimated to be 58 acre-feet (AF) or .14 AF per valve. The total lifetime water savings is estimated at 290 AF (.71 AF per valve per five-year lifetime)

B. "LightWash" Commercial Clothes Washing Machine Incentive Program

Program Description:

Since November 2002, the District has been participating in a state-wide program that provides additional rebate funding (i.e. in addition to water agency rebates) for qualifying high-efficiency commercial clothes washers. This program, known as "LightWash", is managed by Energy Solutions and is funded by the California Public Utilities Commission (CPUC) through the end of 2005. The estimated annual water savings per clothes washer is 21,000 gallons.

Status:

To date, 140 washers have been replaced, resulting in annual water savings of 10.9 acre-feet.

Water Savings:

The LightWash program will not be funded after December 31, 2005. However, MMWD will continue to offer rebates for commercial clothes washers. The number of washer rebates has decreased by 30% each year, and it is expected that this trend will continue. An expected annual participation level of 15 washers per year would result in an additional 1.2 acre-feet of annual water savings.

C. Commercial Dishwasher Rebate Program

Program Description:

In October 2003, the District began offering the Commercial Dishwasher Rebate Program. The program offers rebates for food service businesses that are replacing their commercial dishwasher (through either lease or purchase) with a like model that is water efficient.

Status:

Two dishwashers have been replaced and rebated through this program.

Water Savings:

The lifetime water savings from the two machines replaced is .82 acre-feet. Additional potential savings are difficult to determine based on unknown participation levels. This remains an on-going program.

D. Water Use Surveys - Conservation Assistance Program "CAP"

Program Description:

Staff evaluates all water-using equipment at commercial sites, which may include restroom facilities, kitchen equipment, cooling towers and irrigation systems. Based upon the findings at the site, the District may offer financial incentives to the District customer to help defray the cost of replacing or retrofitting equipment.

Table 5. CII Water Use Surveys						
Year	2001	2002	2003	2004	2005 (proj)	Total
# surveys	12	4	9	15	15	55
Incentive	<i>Incentives are tracked under individual incentive programs</i>					
# follow-up	23	8	9	15	5	60

Status:

The commercial sector has had 55 site consultations performed from 2001 - 2005.

Water Savings:

Water savings are tracked under individual programs, i.e. CII ULFT Retrofit Programs, LightWash, Rinse & Save, etc.

E. Commercial Institutional Industrial (CII) ULFT Retrofit ProgramsProgram Descriptions:**1. Rebates & Direct Installations**

The District has continually offered toilet retrofit programs for commercial customers since 1994. To date, over 7,000 CII toilets have been retrofit through these various programs, which have included rebates, free toilets, and no-interest loans.

From 2001 - 2005, 315 toilets were retrofit through the rebate program, with annual water savings of 9 acre-feet. In early 2005, rebate amounts were increased to \$200 in conjunction with a new toilet replacement program that offers free toilets plus installation. To date, 155 toilets have been retrofit through the free toilet program, resulting in water savings of 4.5 acre-feet annually. Both the increased rebate and free toilet programs are currently set to end December 31, 2005.

2. Schools Program

Developed in 1996, this program originally targeted schools and was designed to remove financial barriers for the institutions. The District paid for the initial costs of the retrofits and the schools would then repay the District from their annual water savings. The program has been adapted to assist any high-use setting where the District's involvement is cost-effective. In 2003, 25 toilets were retrofit in the Kentfield School District and, in collaboration with the County of Marin, 75 toilets were retrofit in the Marin Civic Center. The last major project under this program occurred in 2004, when 89 toilets were replaced at the College of Marin's Kentfield Campus. These projects provide an annual water savings of 7.5 acre-feet.

3. San Quentin Toilet Retrofit Project

In 2002, MMWD staff began working with San Quentin to develop a plan to retrofit their 2,600 existing 3.5 gallon-per-flush toilets with 1.9 gallon-per-flush programmable flush valves. In 2003, the District purchased 75 upgrade kits for Icon flush valves (and 2 hand-held programming units) that were installed by in-house plumbing staff as a pilot test. In 2004, San Quentin made an initial purchase and began installing 1,570 valves for which they will receive a rebate of \$150 per valve. To date, approximately 200 toilets have been retrofit, and installations are expected to continue into 2006. The retrofits accomplished to date will yield 25 acre-feet of annual water savings.

Table 6. CII ULFT Retrofits						
Year	2001	2002	2003	2004	2005 (proj)	Total
# retrofits	251	141	187	82	475	1,136
Water savings – AF/Y	7	6.5	12	2	33	60.5

Status:

These programs are on-going. The rebates and free toilet programs are currently scheduled to end December 31, 2005. The installation of 1,470 valves at San Quentin is expected to continue through 2006.

Water Savings:

The greatest potential savings comes from toilet retrofits at San Quentin. Annual water savings of over 310 acre-feet could be obtained by retrofitting the remaining 2,500 toilets.

10. Wholesale Agency Assistance Programs

Not applicable.

11. Conservation Pricing

The District meters all services and charges for use based on the amount of water used. Most meters are read and billed on a bimonthly basis; however, many of the District's largest accounts are read and billed on a monthly basis. The use of tiered rates to promote on-going water conservation has been in place for the past decade. Customers are billed based on an inverted block rate structure, with a fixed service charge based on meter size. The rate structure was amended in 2004 to include a fourth tier to discourage excessive irrigation water use. Tier one is \$2.43/ccf, tier two is \$4.86/ccf, tier three is \$9.72/ccf and tier four is \$14.58/ccf.

Under our current system, about two-thirds of our single-family residential customers are in Tier 1 year round; another third pay for some of their use at the Tier 2 rate, typically during the summer and fall months; while under 5% pay in Tier 3 and Tier 4.

The conservation rate structure is a way to encourage water conservation for uses that are not essential for public health and safety or economic vitality. While large landscapes of lawns and high water use plants can be attractive, they are not essential. We contact and work with our customers who have use in the higher tiers to help them understand the value of conservation measures and proper maintenance of water using fixtures and systems. For example, we have found that the repair, proper maintenance and use scheduling for a landscape irrigation system typically reduces water use of the system by 20%. In fact, some customers whose water use places them in the new Tier 4 can be released from those higher rates through proper landscape system operation, while all others can be released by meeting the requirements to be granted a variance from Tier 4 (see below) by installing water saving equipment and conforming to certain landscape requirements.

Water Entitlements and Budgets for Commercial, Industrial and Institutional (CII) Accounts

A Technical Advisory Committee, composed of citizens appointed by the Board, investigated possible water conservation options and issued a report in 1990 calling for the assignment of "water budgets" to MMWD CII customers. The water budgets were intended to be the maximum amount of water the District is committed to supplying new accounts, check existing customers from increasing water use, and indicate the quantity of water the District is committed to supplying all of its customers. The District began assigning water budgets to new CII services in 1989 and all existing CII services in 1991.

The program was subsequently refined to include "water entitlements" in addition to water budgets. A water entitlement is defined as "the maximum amount of water the District is committed to supply any individual service on an annual basis." A water budget is defined as "the District's determination of the actual consumption requirement of the service." The water budget may be less than or equal to, but may in no case exceed the water entitlement for the service.

The water budget serves as the basis for the District's inverted block billing structure. The water budget is allocated over six bi-monthly billing periods. This allocation is called the "baseline." The water budget also serves as the basis of water allocations to an individual service in mandatory levels of rationing in the District's comprehensive rationing program.

A substantial amount of ongoing maintenance is required of accounts that have entitlements and budgets. Baselines are adjusted when requested by customers. Assistance is often requested when customers are evaluating the water use impacts of potential new tenants. All service turn-on requests for accounts must be evaluated for baseline allocations and water use needs. In addition, the District conducts plan reviews to ensure sufficient water is available at the site to serve the proposed project.

Tier 4 Exemption

Description:

On January 1, 2004, a fourth tier was added to the residential rate structure to address summer irrigation use. Customers may apply for an exemption to remove themselves from the Tier 4 billing rate. To be eligible for an exemption from the Tier 4 water rate (i.e., to be billed at the Tier 3 rate), Tier 4 customers must meet a set of strict guidelines concerning their landscape and irrigation system, which must be confirmed by an inspection performed by district staff. Upon passing the inspection, a Tier 4 Exemption is valid for two years. Customers must reapply for subsequent Tier 4 Exemptions for continued eligibility.

Status:

Since enacting the Tier 4 Exemption process in March 2004, staff has received 96 exemption applications, with 28 applicants successfully meeting the exemption requirements.

Water Savings:

Staff has not yet performed water savings analysis on customers who have met the Tier 4 exemption requirements.

12. Conservation Coordinator

MMWD has maintained a full-time conservation Coordinator position since July 1992.

13. Water Waste Prohibition

Program Description:

Since the Drought of mid-1970s the District has had water waste prohibitions. In 2002, the District adopted Ordinance 395, a graduated enforcement program and Rate Structure for water wasting customers.

Status:

Staff investigates reports of water waste by conducting site visits. The customer is alerted to the wasting condition on their property and requested to correct the problem. If the problem is not corrected in a time frame allowed under Ordinance 395, the customer is subject to fines. Since 2001, staff has contacted over 400 customers identified as water wasters.

Water Savings Potential:

It is very difficult to estimate the amount of water savings that may be achieved through this program. To some extent, one of the main values of the program is education on a one-on-one basis with the customer who has been identified as a water waster.

14. Residential Ultra Low Flow Toilet (ULFT) Replacement Programs

Incentive Programs

Program Description:

The toilet retrofit programs have been a cornerstone of the District's water conservation programs since 1994. Over 41,600 ULFTs have been retrofitted in single- and multi-family sites through the District's various incentive programs (i.e. rebates, free toilets, no-interest loans), resulting in water savings of 654 acre-feet annually. This total includes 3,660 toilet retrofits that occurred from 2001-2005, representing 57 acre-feet.

Staff has been able to document the replacement of another 14,000 residential toilets during the drought before the incentive programs were in place. In addition, it is likely that consumers have retrofitted a substantial number of additional toilets without going through District incentive programs.

Although the residential toilet rebate programs ended in 2002, the District continued efforts toward accelerating toilet replacements by developing a direct-install toilet retrofit program for apartments and multi-family sites. This program operated from February 2004 – September 2005 and resulted in 770 toilet retrofits, with associated annual water savings of 15.5 acre-feet annually.

Status:

The District phased out its residential Toilet Rebate Program in mid-2002 and adopted a Time-of-Sale ordinance requiring the installation of ULFTs when a property is sold.

Water Savings:

From 2001 to mid-2002, over 2,800 toilets were retrofit in single- and multi-family sites, resulting in annual water savings of 42 acre-feet.

ULFT Retrofit Ordinances

Program Description:

A Time-of-Sale ordinance requiring the installation of ULFTs when a property is sold was initiated in June 2002. The Time-of-Sale ordinance was modified in October 2004 to a Time-of-Service ordinance, which requires property owners to install ULFTs within six months from the date when water service is modified at their property.

Status:

Since June 2002, over 3,700 toilets have been replaced as a result of the Time-of-Sale. As of August 2005, over 500 toilet replacements are still pending and scheduled to be completed by November 2005. Annual water savings from existing retrofits is 50 acre-feet.

Water Savings:

In total, the Time-of-Sale Ordinance will likely accomplish over 4,200 toilet replacements in about 3.5 years and result in annual water savings of over 56.5 acre-feet. This is in addition to the 50 acre-feet saved as a result of the Time-of-Sale program.

Over its first year, the Time-of-Service program has resulted in over 1,000 retrofits and annual water savings of 13.5 acre-feet. The Time-of-Service Ordinance is expected to generate 1,000 – 1,500 retrofits per year, with associated water savings of 13.5 – 20 acre-feet per year.

Table 6. Residential ULFT Replacements						
Year	2001	2002	2003	2004	2005 (proj)	Total
SFD (rebates)	2,319	0	0	0	0	2,319
SFD (ordinances)	0	788	1,036	1,385	2,430	5,639
MFD	564	0	172	267	337	1,340
Water Savings – AF/Y	42	10.6	17	23.6	39.6	132.8

SFD – Single Family Dwelling
MFD – Multi-Family Dwelling

